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Interim Report 91-AA

ERCB

The OSLO Project

A Commercial Oil Sands Project

CANADIANA

APR 14 1992

An Interim Report of the
OSLO Application Review Team

November 1991

ERCB

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A Commercial Oil Sands Project

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EXECUTIVE SUMMARY

The ERCB established an application review team composed of representatives of the public, government and OSLO to facilitate the assessment of OSLO's proposal to construct and operate an oil sands surface mining and bitumen extraction plant in the Fort McMurray area, and an upgrading plant in the Redwater area. The OSLO project was to produce 4.5 million cubic metres per year of marketable hydrocarbon, commencing in 1996 for a period of 35 years, from its leases north of Fort McMurray.

The OSLO Application Review Team (OSLO ART) consisted of representatives from OSLO, Alberta Environment (A.Env.), Alberta Forestry, Lands and Wildlife (FL&W), Alberta Energy (A.E.), the Fort McKay Indian Band (the Band), the City of Fort McMurray, the Energy Resources Conservation Board (ERCB), Athabasca Native Development Corporation (ANDC), the Municipal District of Sturgeon and the Federal Environmental Assessment Review Office (FEARO).

The terms of reference were developed in early 1989, and updated as required. These provided for OSLO ART activity prior to and after the filing of OSLO's application to the ERCB and its conclusion prior to an ERCB public hearing. The main objectives of OSLO ART were to maximize the cooperation and communication among the parties, maximize each party's satisfaction with the design and management plans for the project, and minimize the time and cost associated with review of the application and with the approval procedure. OSLO ART met regularly between January 1989 and June 1991 and its work is documented in this report. OSLO's decision in April 1991 not to proceed with the project and not to file an ERCB application resulted in OSLO ART work concluding prematurely; this "Interim OSLO ART Report" reflects this and identifies issues and their status as of mid-1991 and makes recommendations on future activities.

In mid-1989, OSLO ART identified the major issues related to the project. These were organized by OSLO into the Issues Management Summary which was updated approximately on a quarterly basis to reflect progress and change in the issues status. Matters requiring specialized consideration such as Aboriginal Issues, Fort McMurray and Region Infrastructure, environmental issues and detailed technical issues were dealt with by subcommittees. Technical subcommittees focused on the following areas: geology or resource base, mining, extraction, upgrading, and utilities and off-sites. Additionally three special meetings were held to address tailings management issues; these meetings were attended by representatives of OSLO ART and its subcommittees.

In general, the OSLO ART process was an excellent forum to identify issues and address them at an early stage of project planning. OSLO ART believes the process should be re-initiated if the project is reactivated and in the interim a means should be established to keep stakeholders informed and in a good position to move forward expeditiously on the project as deemed necessary. Additionally, a number of key technical issues relating to bitumen extraction, tailings management and energy efficiency warrant ongoing attention to develop more environmentally acceptable and efficient oil sands projects.

ACKNOWLEDGEMENTS

The success of OSLO ART was a result of the dedicated work of a large number of people, most of whom are identified in the Appendices. Key among these are Mr. Ralph Evans and Dr. Randy Gossen who spearheaded the efforts of the ERCB and OSLO. The Subcommittee Chairmen, identified in Appendix F, also warrant particular mention.

1 INTRODUCTION

The Other Six Leases Operation (OSLO) Project proposal is to construct and operate a surface mining and bitumen extraction oil sands plant in the Fort McMurray area, and an upgrading plant in the Redwater area. The operation would produce 4.5 million cubic metres per year of marketable hydrocarbon, commencing in 1996 for a period of 35 years, from within the requested project areas (Figure 1-1).

2 OSLO APPLICATION REVIEW TEAM (OSLO ART)

2.1 OSLO ART Proceedings

The two senior levels of government, and the project owners signed the Statement of Principles in September of 1988, with a proposed appropriation date of 1 July 1991. It was clear that the time frame, from the commencement of the design basis engineering studies to the ERCB application, through to the appropriation date, was extremely tight. As a result, at a January 1989 meeting of senior officials of OSLO, Alberta Environment (A.Env.), Alberta Energy (A.E.), Alberta Forestry, Lands and Wildlife (FL&W), the Fort McKay Indian Band (the Band), the Athabasca Native Development Corporation (ANDC), and the Energy Resources Conservation Board (ERCB), it was agreed that the schedule could best be met by utilizing an Application Review Team (OSLO ART).

It was agreed that OSLO ART would not be a decision-making body but would only make recommendations to the ERCB with respect to resolution of specific issues of the application. As well, it was understood by all ART members that a public hearing would be required, partly to satisfy the federal government's Environmental Assessment and Review Process (EARP) Guidelines Order should the responsible federal authority decide that a full public review is necessary, and also in the event that interventions were received by the ERCB upon filing of a "Notice for Objection" of the application. It was further agreed that the OSLO application to the ERCB would reflect all agreements achieved by OSLO ART such that an OSLO ART report could be written in a time frame roughly consistent with the filing of the application. This would allow all concerned parties, whether they were or were not OSLO ART participants, time to fully review both the application and the recommendations of OSLO ART prior to the ERCB hearing.

Initially, OSLO ART consisted of representatives from OSLO, A.Env., A.E., FL&W, the Band, the City of Fort McMurray, and the ERCB. Subsequently, the ANDC was added and, in January of 1990, an agreement was reached (though not signed) between the federal government and the Province of Alberta which stated how the EARP would be handled with respect to the pending OSLO application. As a result, the Federal Environmental Assessment Review Office (FEARO), representing the government of Canada, was invited to become a member of OSLO ART, an invitation which it accepted in February 1990. In July 1990, the OSLO Project management team made a significant change in the design of the project by relocating the upgrader from Lease T31 to a site near Redwater. As a result of this design change, the Municipal District of Sturgeon was also invited to become a member of OSLO ART. A list of participants in the OSLO ART meetings is provided in Table 1, Appendix F.

As a result of the OSLO owners' decision in April 1991 to defer indefinitely the filing of an ERCB application, OSLO ART members agreed to document and summarize the activities to date of OSLO ART and its subcommittees in an "Interim Report of OSLO ART". This report is intended to provide information on issues discussed and resolutions reached through the ART process and is also

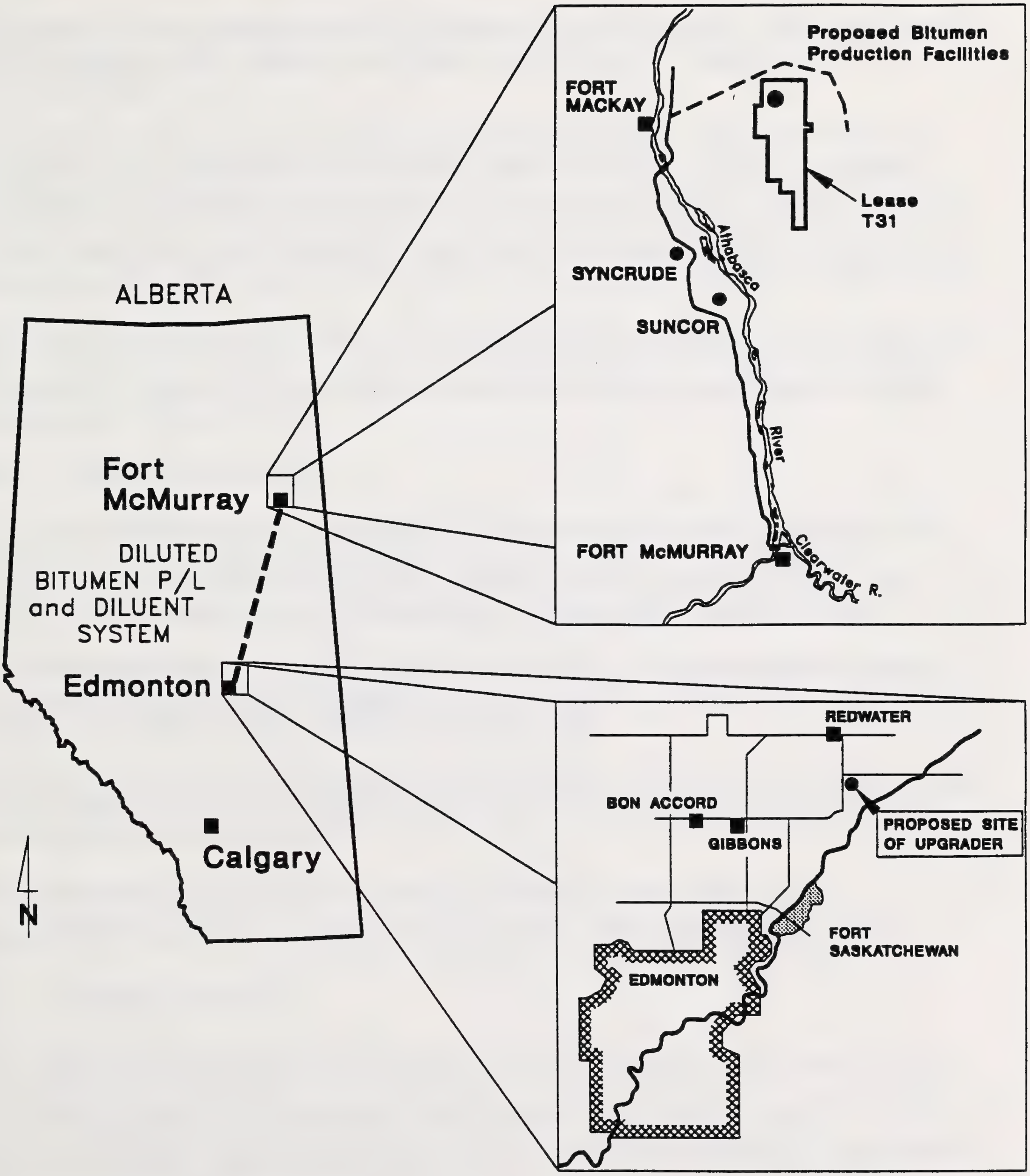

Figure 1-1: OSLO Proposed Project Facilities Location

ERCB

designed to provide recommendations for an approach to re-initiating the OSLO ART process when OSLO initiates an ERCB application. In addition, recommendations on changes to improve the process are made.

In all, OSLO ART met 24 times between January 1989 and June 1991. The Terms of Reference (Appendix A) were developed in early 1989, and updated as required. The Terms of Reference recognize that final decisions on the application would be in conformance with established legislation. The main objectives of OSLO ART were to maximize the cooperation and communication among the parties, maximize each party's satisfaction with the design and management plans for the project, and minimize the time and cost associated with review of the application and with the approval procedure.

OSLO ART considered matters relating to the principal topics of energy resource conservation, on-site and off-site environment protection, orderly and efficient development of the resource (including land disturbance), fulfilment of the public interest, region infrastructure, and employment and business opportunities for the local residents.

2.2 OSLO ART Subcommittees

OSLO ART recognized that the level of detail required to properly review and evaluate some of the major issues could be better handled through the use of subcommittees. As a result, eight subcommittees were formed, including Geology, Mining, Extraction, Upgrading, Utilities and Off-Sites, Fort McMurray and Region Infrastructure, Aboriginal Issues, and Environmental.

The membership of these subcommittees is shown in Appendix B. Each subcommittee consisted of representatives from OSLO ART participating government agencies, public groups, and OSLO, each of whom had specific expertise or interest in the issues at hand.

The Fort McKay community was funded by the OSLO Project to retain consultants to prepare reports to assist OSLO in the preparation of socio-economic and environmental impact assessment reports. These reports were provided to OSLO.

Each subcommittee was responsible for thoroughly reviewing the issues and for making recommendations to OSLO ART as to how the ERCB should handle these issues. The issues discussed and recommendations from each subcommittee are incorporated in this interim report.

3 PROJECT SUMMARY

The OSLO Project is a proposal for a commercial oil sands development. It would include a surface mine and extraction plant located on a portion of OSLO Lease T31 near Kearl Lake, approximately 60 kilometres (km) north of Fort McMurray, Alberta (Figure 3-1). The OSLO upgrader would be located approximately 7 km south of Redwater, Alberta. The two components would be connected by pipelines, one to bring diluted bitumen to the upgrader, and another to return the diluent to the bitumen production facilities at Lease T31.

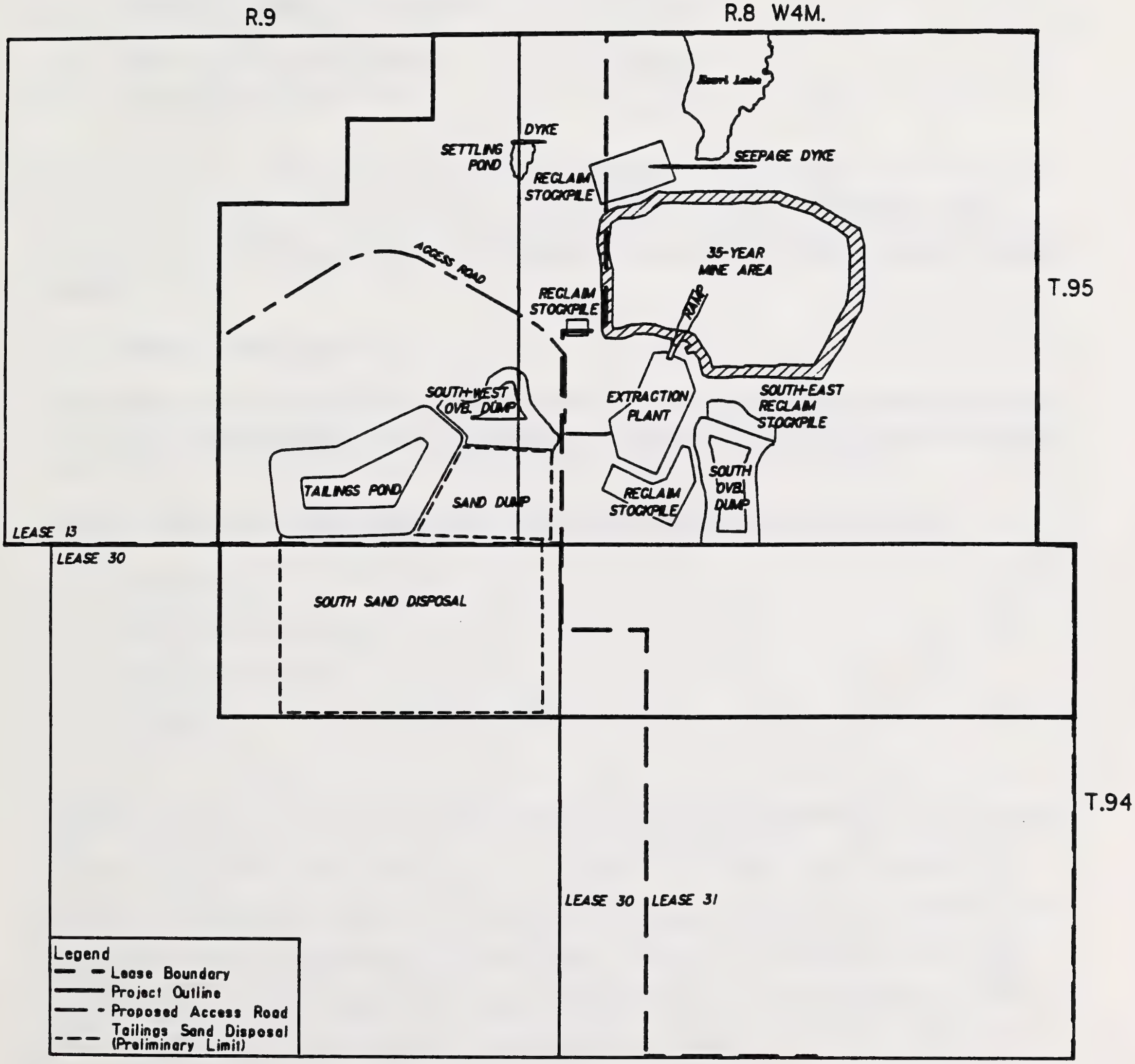

Figure 3-1: OSLO Proposed Project Area

The project is being undertaken as a joint venture by the owners of six oil sands leases in the Fort McMurray area. The OSLO owners and their respective interests are:

• Alberta Oil Sands Equity	10 per cent
• Canadian Occidental Petroleum Ltd.	20 per cent
• Esso Resources Canada Limited	25 per cent
• Gulf Canada Resources Limited	20 per cent
• PanCanadian Petroleum Ltd.	10 per cent
• Petro-Canada Inc.	15 per cent

The proposed project involves using conventional surface mining techniques to strip the overburden and mine the oil sands. Bitumen would be extracted from the oil sands by a hot water process, diluted, and then transported by pipeline to the Redwater area. Using hydrogen addition technology, the upgrader would convert the bitumen into synthetic crude oil suitable as feedstock for conventional refineries.

4 ISSUES MANAGEMENT

In mid-1989 OSLO ART identified the major issues related to the project. These were organized by OSLO into the **Issues Management Summary** as shown in Appendix C. This document was updated approximately on a quarterly basis to reflect progress and change in the issues status.

The main technical issues discussed by OSLO ART were grouped into the following areas:

- project area,
- resource base,
- mining and discard sites,
- extraction and tailings,
- upgrading,
- utilities, and
- off-sites.

Biophysical and socio-economic issues were discussed as part of the preparation of the Environmental Impact Assessment (EIA) and the Socio-economic Impact Assessment (SEIA). The submission of the EIA as part of the ERCB approval process is a requirement for the OSLO Project, confirmed by A.Env. to OSLO on 2 May 1989. Federal environmental assessment requirements are applicable to the project. Fisheries and Oceans Canada in March 1991 initiated consultations with other federal departments in order to complete an initial assessment of the project in accordance with the EARP Guidelines Order. A decision on the need for a full public review was not reached prior to OSLO putting the project on hold. Fisheries and Oceans Canada do not plan to complete its initial assessment until and if a decision is made to proceed with the project.

The governments of Canada and Alberta announced on 25 January 1990 that the OSLO Project would be subject to a joint public environmental assessment review process. However, a formal agreement has yet to be signed.

Preparation of a project design basis by OSLO's technical staff has been under way since 1989. Some key aspects of the design basis, such as water management plans, details of the upgrader facility design, and a tailings management scheme have been completed. The mine plan was established in considerable detail. Outstanding issues with respect to the project design, process-associated research needs, and recommendations for work toward further technical improvements are noted in Appendix E.

OSLO has identified plans to submit a number of reports in support of an application to the ERCB. The complete list is noted below.

1 Project Application and Project Summary
2 Economic Analysis
3 Lease T31 — Bitumen Production — Technical Application
4 Lease T31 — Bitumen Production — EIA
5 Lease T31 — Bitumen Production — SEIA
6 Upgrader — Technical Application
7 Upgrader — EIA
8 Upgrader — SEIA
9 OSLO Project EIA Issues Scoping Report
10 OSLO Project EIA Baseline Report

Of the ten reports noted, Items 4, 5, 7, 8, 9, and 10 are directly associated with the EIA (biophysical EIA and SEIA); Items 9 and 10 have been prepared in draft form and submitted for information to the Environmental Subcommittee.

Sections 5 to 12 of this report contain OSLO ART subcommittee reports. If further information is required on specific OSLO ART subcommittee reports, a complete set, as well as this report, will be available at the ERCB offices in Calgary (ERCB Library), Edmonton, and Fort McMurray.

5 GEOLOGY

The Geology Subcommittee held three meetings between 8 November 1989 and 9 March 1990. In conjunction with the Mining Subcommittee, two working sessions were organized to discuss specific issues such as the plant site geology and geophysical log response. A list of participants in the Geology Subcommittee meetings is provided in Table 2, Appendix F. The following summarizes key issues and topics discussed.

5.1 Project Geology

Some 1000 auger holes comprise the overburden database. Samples taken at 1.5-metre (m) intervals are classified into a number of Holocene, Pleistocene, and Cretaceous aged facies units. A combination of electrical and seismic geophysical methods was used to aid in structural interpretation between drill holes. Approximately 500 km of geophysical profile lines have been completed within the project area. OSLO stated that overburden is defined as all material above the McMurray Formation and includes the Wabiskaw, Clearwater, Pleistocene and Holocene units. The Wabiskaw Member is considered a basal member of the Clearwater Formation. OSLO identified an erosional edge of the Clearwater Formation that trends north-east/south-west throughout the project area. OSLO also identified a large Pleistocene channel which cuts deeply into the McMurray Formation in the proposed tailings pond area and adjacent to the south-west of north-west limit of the mine site. The ERCB staff agrees with OSLO's interpretation of the Clearwater erosional edge, although there are some minor interpretational differences as to the thickness of the Wabiskaw Member. The

Subcommittee agreed with the approach taken by OSLO to define the overburden characteristics and also agreed to discuss tailings site hydrogeology as part of the Mining Subcommittee.

OSLO outlined the coring and geophysical logging programs undertaken within the mine and plant site areas. Over 350 drill holes have been logged and cored as of the end of 1989. OSLO has initiated an aggressive core recovery program which sets a maximum of 15 per cent lost core for each drill hole. The depositional environment data, facies codes, core analysis, fines analysis, and geophysical results have been used to construct a three dimensional geological block model which is tested against known structural features to ensure model credibility.

OSLO stated that approximately 60 per cent of the mine site feed is contained in the fluvial/estuarine environment, 35 per cent in the upper peritidal environment and 5 per cent in the marine environment. The centre of the mine site contains thick high-grade fluvial/estuarine sands while the edges of the mine site contain thick lower grade upper peritidal sands. The plant site location falls along this edge and contains a lower quality resource.

The ERCB staff examined the plant site drilling data and found that some lower grade sands do exist within the upper to middle portions of the sequence. However, there are areas within the plant site location where the grades were consistently above 10 per cent bitumen by weight. General agreement was reached upon the plant site geology and discussions regarding the plant site resource potential were addressed by the Mining Subcommittee.

OSLO questioned the ERCB staff as to the applicability of seismic and electromagnetic methods in support of identifying geologic structures and the location of surface facilities. The ERCB staff stated that a minimum of one cored and logged drill hole per quarter section is required under the Oil Sands Conservation Regulations for defining the location of discard sites and surface facilities. The ultimate number of drill holes required to interpret these areas would largely be a function of the geological variability. The use of additional methods to augment this drilling could be useful especially in determining infill drilling and confirming interpretation; however, it should not substitute for adequate coring and logging control.

OSLO identified a number of potential dump sites which were interpreted to be unattractive for resource development and in close proximity to the 35-year mine. The resource lows resulted from a lack of bitumen-bearing sediments and/or the erosional effect of the Pleistocene channel.

The south-west overburden dump, tailings pond, and sand dump area geology were presented to the Subcommittee. The ERCB staff reviewed the drilling information and found that the south-west overburden dump overlies lean oil sands which thins from north to south. OSLO presented various contour maps and typical cross-sections of the tailings site which identified this area to be of poor resource development quality. The ERCB staff examined the drilling information and found isolated occurrences where the resource appeared attractive. These small areas were not connected to any degree. This assessment was generally consistent with that of OSLO.

OSLO stated that portions of the sand dump area, west overburden dump, and all of the south overburden dump overlie the Clearwater Formation. This fine-grained silt and clay shale contains a sensitive smectite swelling clay which could be a foundation concern. A site-specific sampling and testing program would be conducted as part of the design of these sites.

OSLO presented information on the Pleistocene channel. Generally the channel is broad and shallow (35 m) in the north and becomes narrow and deep (65 m) in the south. The channel is primarily sand filled with a glacial till cap in the north, and becomes till filled with minor sand channels in the south. The thickness of the till cap over the northern sand-filled portion of the channel is variable. Piezometers installed in the channel have suggested a slight overall gradient from south to north. This channel is believed to be a significant freshwater aquifer with connection to surface features. No evidence of sinkholes or fault displacement into the lower McMurray was found.

OSLO presented information which supports the existence of a large regional hydraulically connected watersands which makes up a large portion of the continental fluvial sands in the lowermost McMurray. The total watersands thickness can reach 30 m with an artesian hydraulic head between 10 to 15 m below the overburden contact. OSLO has identified minor concentrations of hydrogen sulphide (H_2S) gas dissolved in the watersands. A method to handle the gas during depressurization is being explored by OSLO. Analysis of basal piezometer samples indicate the water quality is near freshwater standards. Pump testing programs conducted to date show no response from surficial or Devonian aquifers which suggests vertical confinement but extensive lateral recharge.

5.2 Conclusions

The Subcommittee considered the issues presented to have been discussed satisfactorily and no additional topics or concerns were identified. The ERCB staff believes the drilling density within the OSLO Project is sufficient to evaluate the locations of discard sites and surface facilities. The ERCB staff also supported OSLO's method of resource interpretation and volume calculations.

6 MINING

The Mining Subcommittee held five meetings between 6 December 1989 and 24 November 1990. In conjunction with the Subcommittee's activities, a number of working sessions were organized to discuss specific issues such as the plant site location and ore criteria. A list of participants in the Mining Subcommittee meetings is provided in Table 3, Appendix F. The following summarizes key issues and topics discussed.

6.1 Reserves

OSLO stated that the ore reserves within the proposed mining area allow sufficient planning flexibility to ensure maximum production for the 35-year project life. These reserves total some 148 million cubic metres of net recoverable bitumen with an average mined diluted grade of 11.4 per cent.

An extensive amount of information was presented by OSLO in support of a dual ore criteria. Upon examination of this information, the ERCB staff concurred with OSLO that the crude bitumen reserve is relatively insensitive to an increase in minimum mining thickness from 3.0 m to 5.0 m. The ERCB staff considered the issue of cut-off criteria to be complex and evolutionary in nature and was in agreement with OSLO's proposal of minimum bitumen criteria of 6.5 per cent and 7.5 per cent, for an initial period, subject to further review during each year of operation. OSLO stated that a unique set of evaluation parameters are required to determine if a potential ore zone should be recovered when it is separated from the main zone by waste, or if large elevation fluctuations occur at the base of potential ore. A decision of whether or not local extremes are recoverable will depend upon economics, synthetic crude oil price, equipment limitations, and depressurization requirements. The

Subcommittee did not object to the application of separate criteria; however, the ERCB staff stated that the application of these criteria would be reviewed during each year of operation when applicable.

6.2 Mining Method Selection

OSLO stated that a truck-and-shovel mobile mining method had been selected for the project by applying a screening method which examined an exhaustive list of potential equipment and methods. An examination of four short-listed alternatives led to a final short list of two methods for detailed comparison. A truck-and-shovel mobile method and a shovel-and-mobile-crusher method were evaluated by completing 35-year mine plans for each. Detailed economic and risk analysis conducted by OSLO judged the two methods to be equally attractive. Based upon the technical analysis, which considered factors such as geology, feed reliability, flexibility, waste management, and technology, the truck and shovel mobile option was judged superior. The ERCB staff requested that an explanation of the four short-listed equipment comparisons and a summary of the detailed analysis be included in the application. OSLO also stated that the equipment selected differs from that at Syncrude Canada Ltd. and Suncor Inc. operations or from that previously proposed by Alsands, primarily because of differences in geology but also because of a different economic environment and technology.

The Subcommittee agreed with the approach taken to select a mining method; however, it recommended that OSLO continue testing new mining technologies including borehole mining and dredging.

OSLO presented the results of a study comparing three different areas for opening the mine. Factors examined included ore-grade fluctuations, in-pit waste management, overburden stripping, and haulage. A south-west opening was selected. This optimized waste management, stripping ratio, pit floor strength conditions, and feed-grade considerations. In terms of waste management, OSLO plans to utilize external waste areas during the initial 3 to 4 years. Further mine solid wastes would then be placed in the mined-out pit. Tailings sand dumps would be developed at the external tailings site for the first 21 years after which in-pit disposal would accommodate most of the sand volumes generated. All fine tailings (sludge) would be stored in-pit and below ground upon project completion.

OSLO presented the assumptions and factors used to evaluate the pit wall treatment regarding in-pit dyke design. This evaluation examined the impacts of in-pit waste disposal associated with zero, partial, and full wall burial of the final pit wall with in-pit dyke waste. The factors considered include resource sterilization, out-of-pit land disturbance, timing of in-pit disposal, operational and cost factors, and environmental impacts. OSLO recommended full wall burial based upon the following reasons:

- less surface disturbance,
- reduced in-pit construction costs,
- reduced environmental impact, and
- increased storage volume.

The ERCB staff stated that OSLO should develop an in-pit waste plan such that future recovery of oil sands at the final pit wall could take place without affecting the integrity of the in-pit dyke structures.

OSLO identified the existence of an extensive interconnected watersands zone located primarily below the base of potential ore and found throughout most of the mine area. Pumping tests conducted by OSLO indicate the aquifer to be hydraulically uniform, confined to McMurray sediments, and conducive to depressurization using a relatively small number of high-capacity wells. OSLO stated the wells would be placed adjacent to the pit limit, as mining progresses, to lower hydrostatic heads near the ultimate pit floor. Water quality analysis conducted by OSLO indicates the basal water is close to potable water standards but contains a low concentration of H_2S gas. OSLO stated a method to treat this gas is being examined. All treated basal aquifer water will be used to either build up pre-production water inventory in the tailings pond, or will be sent to the process water pond or mixed with other non-process waters in the inventory control pond during operations. Water from the inventory control pond may then be released to the Athabasca River to balance the project water requirements. The ERCB staff requested that OSLO address the effect of water inflow to the pit upon final wall stability and in-pit tailings after mining ceases.

6.3 Project Area

6.3.1 Project Boundaries

OSLO presented a conceptual lease development plan that confirmed that sufficient reserves exist within Lease T31 to support mining activities well beyond the 35-year base plan (Figure 3-1).

The project boundaries encompass areas of disturbance proposed by OSLO for 35 years of development. Although the Subcommittee was generally in agreement on the issues, some committee members felt that further discussion was required on reserves-related items.

The shape and size of the mine are primarily a function of the geology; however, other features such as lease boundaries and Kearl Lake have also been considered. The edges of the Pleistocene channel limit the mine boundaries in the south-west and north-west. A 300-m offset from Kearl Lake forms the north limit and the Shell Lease T13 boundary limits extension to the west. The edge of a lagoonal channel limits the mine in the north-east while a break point in the resource quality limits the mine boundary to the east and south.

6.3.2 Plant Site Location

Plant site location is largely determined by mine site location. OSLO stated that five potential plant site locations were examined prior to making a selection. The guidelines used to evaluate each of the five sites were:

- minimize mine feed and tailings transport costs,
- minimize potentially high foundation costs,
- minimize environmental impacts,
- avoid major extensions of the mine area, and
- maintain site flexibility for future expansion.

Advantages and disadvantages of each site were presented with respect to feed conveyance and tailings pumping costs, topography, and foundation conditions. OSLO also presented an environmental assessment of each site which considered the following:

- the potential impact upon flora, fauna, fisheries, forestry, and historical resources,
- soil character, geology, and reclamation potential, and
- surface drainage systems and air quality.

OSLO stated the proposed plant site is the optimum result considering it provides the lowest cost for tailings and ore transport, competent foundation material, and minimum environmental and resource impact. As well, it does not interfere with the 35-year mine life.

OSLO's preliminary proposal for plant site location was reviewed by the Mining Subcommittee. Concerns related to resource sterilization expressed by the ERCB staff resulted in OSLO tabling a revision. This was accepted by the Subcommittee.

6.3.3 Overburden Discard Site

OSLO identified four potential overburden sites in the north-west, north-east, south-west, and south, where the resource quality was poor. The north-west and north-east sites were rejected owing to limited size. However, the north-west site is still considered by OSLO to be a potential candidate in future. The west and south overburden site plans were presented to the Subcommittee. Upon examination of the drilling information, the ERCB staff concurred with OSLO's interpretation that the oil sands resources under these sites were unattractive using current surface mining methods. OSLO further identified the locations of five temporary reclamation stockpiles assessed using guidelines similar to that listed above. The Subcommittee had no concerns regarding the location of these sites.

FL&W, ERCB, and OSLO discussed the dump and stockpile locations with respect to merchantable timber. In terms of the sites proposed by OSLO, FL&W requested the south dump not extend any farther east or south-east and the north-east stockpile be moved west.

Conceptual designs and storage volumes were presented for the external waste areas and stockpiles. Temporary stockpiles would be constructed primarily, as a winter operation, of drained selectively mined Holocene materials. Permanent waste areas would be constructed to contain overburden (excluding muskeg), mine, and extraction rejects. A portion of the south-west overburden dump and all of the south overburden dump are located over the Clearwater Formation which could be a foundation concern. Final dump designs will reflect the competency of the foundation materials encountered.

Geotechnical details of the tailings dyke design were largely unavailable; however, it can be stated that competent foundation materials exist within the tailings pond location. The Clearwater Formation is limited to portions of the sand dump area. OSLO stated there was no evidence to suggest the presence of sinkholes within the project area based upon drilling and seismic data.

OSLO stated its intention was to minimize out-of-pit storage and maximize in-pit storage of tailings. OSLO is currently studying disposal methods and plans on being able to achieve a uniform tailings stream density of 65 per cent weight solids through cycloning of tailings and fines injection into the resulting stream.

6.3.4 Tailings Site Location

OSLO stated that five potential tailings sites were evaluated prior to making a selection. The guidelines used to evaluate each site were:

- minimize tailings transport costs,
- minimize resource sterilization,
- minimize environmental impacts,

- have suitable foundation conditions, and
- provide sufficient storage capacity with expansion capabilities.

Advantages and disadvantages of each site were presented with respect to tailings pumping costs, topography, stability concerns, environmental impact, and resource sterilization. The list of potential sites was narrowed to two sites because of pumping distance, topography, environmental, and resource concerns. OSLO presented additional information to further evaluate the differences between these sites. This included an environmental assessment, similar to that completed for the plant site, and an economic assessment of the resource. The resource assessment examined the recoverability of an isolated potential ore pocket underlying the proposed site. Assuming this oil sands would be recovered as a satellite mining operation, OSLO demonstrated the area would be marginally economic at best. Upon consideration of all factors examined, an on-lease site was rejected because of a high-instability risk factor, larger area requirement, and a large elevation increase from the extraction plant. OSLO stated that the proposed site minimizes resource sterilization, operating costs, and the potential for dyke instability.

The ERCB staff stated that future expansion of this site should not extend farther north owing to an attractive resource edge.

The Subcommittee agreed with OSLO's evaluation approach and the proposed site. However, the ERCB staff stated that since the mineral rights for the tailings area are held by Shell Canada Ltd. and Gulf Canada Resources Limited, OSLO should obtain the necessary agreements to utilize this area prior to filing the application.

6.4 Reclamation and Environmental Issues

With respect to drainage diversion, OSLO presented the program undertaken to establish existing hydrological conditions. Peak flows are driven by snow melt and late summer rains. OSLO proposes to intercept all stream headwaters on the east side of the project using a two-phased ditch diversion system which then enters Kearl Lake. The issue of sedimentation ponds was also raised. This issue had been discussed at various meetings held with A.Env. and other government agencies.

The topic of creating a fishery in Kearl Lake was discussed and OSLO stated that since this lake was an operational component of the project, enhancement may be best focused in other areas. The ERCB staff stated this would be prudent owing to the attractive resource located beneath the south half of Kearl Lake and its inclusion in OSLO's lease development plan. FL&W stated that some allowance for habitat improvement should be considered somewhere to offset the impact of the project. The Band supported this view and encourages both OSLO and FL&W to make allowance for aquatic habitat improvement. OSLO agreed that the actual area of habitat improvement should be developed in consultation with appropriate government departments and with the Band to ensure appropriate end land use is achieved.

OSLO stated that soil salvage inventories within the plant and mine sites would provide adequate volumes of material for reclamation purposes. Salvage from other areas was not considered. OSLO plans to selectively mine, stockpile, or direct haul the top 2 to 5 m of good and fair quality materials, based upon certain physical and chemical properties. A.Env. also stated that stockpiling of these materials should begin prior to start-up and recommended soil salvage guidelines follow the work of the Reclamation Research Technical Advisory Committee and not necessarily that of past practices by other operators in the region. A.Env. also indicated that new development and reclamation guidelines being drafted may shift the emphasis of future plans to issue-oriented problems and solutions of a site specific nature. A security fund will be required to cover the total cost of reclamation. Funds would be released upon satisfactory reclamation completion.

In regard to waste areas, reclamation of these sites would be consistent with the information referred to in the mine area. All disturbed sites would be reclaimed to a state equivalent to or more improved than that which had existed prior to disturbance. Each site would be reclaimed to a geotechnically stable, non-erosive, and non-hazardous condition. Temporary stockpile locations would be based upon future reclamation needs.

The environmental issues discussed focused upon the volume and duration of sludge accumulation prior to transfer in-pit, the recovery of bitumen from sludge, seepage of tailings fluids into the groundwater regime, and monitoring, control, and mitigative measures regarding seepage during operation and after abandonment. OSLO stated that extensive geological and hydrogeological data-gathering programs had been conducted to enable work to begin on modelling seepage and flow scenarios from the tailings site into the Pleistocene channel as well as the influence of the basal aquifer upon in-pit tailings.

The Mining Subcommittee's discussion of the issue of sludge treatment at abandonment is incorporated in Section 7.5.

6.5 Conclusions

The Subcommittee considered the issues presented to have been discussed satisfactorily and no additional topics or concerns were identified. General agreement was reached on essentially all issues discussed; however, certain mining and project-related items require additional clarification and final agreement. These include the following:

- pit wall burial,
- infrastructure plans,
- project boundaries, and
- drainage and mining of reserves underlying Kearl Lake.

7 EXTRACTION

The Extraction Subcommittee held six meetings between January 1990 and May 1991. A list of participants in the Extraction Subcommittee meetings is provided in Table 4, Appendix F. The following report summarizes the key issues discussed and their status.

7.1 Alternative Processes

In the selection of an extraction process, the ERCB and A.Env. staff stated that OSLO, and others, should be testing and pursuing extraction processes that would solve tailings management problems of sludge toxicity and bulking, minimize freshwater consumption (make-up), and meet the ERCB's bitumen recovery objective of 95 per cent from mined oil sands feed. OSLO was encouraged to optimize an extraction process that would be "breakthrough" technology in terms of environmental cost and energy efficiency. Reclamation objectives with respect to extraction are discussed in Section 7.5.4.

OSLO stated that it had reviewed in excess of 40 different extraction processes since 1983, and that most of them were rejected owing to the preliminary state of development, the inactivity of the developer, or the lack of meaningful and non-confidential data for analysis and assessment. To select processes or configurations that had the potential to improve on existing commercially proven technology, OSLO advised that the following criteria were used:

- operability and state of development,
- capital and operating cost,
- reduction of water and tailings management problems,
- hydrocarbon recovery, and
- compatibility with the ore body.

These criteria were further subdivided into: operability, complexity, hydrocarbon recovery and product quality, tailings sludge volume and mining interfaces, safety, economics, risk, material handling, service factor flexibility, and stability to feed-grade and fines fluctuations.

In 1984 OSLO considered 21 processes and short-listed them to 11, as shown in Table 7-1. These fell into three generic types: water flotation, solvent extraction, and direct thermal treatment. Syncrude's modified hot water process was selected for the OSLO Project at that time.

TABLE 7-1 ALTERNATIVE EXTRACTION PROCESSES

Water Flotation	**Solvent Extraction**	**Direct Thermal Treatment**
• Syncrude Commercial Hot Water	• SESA	• UMATAC
• Syncrude Warm Water	• COSECO	• Lurgi
• OSLO Hot Water	• Solvex	
• RTR/Gulf		
• OSLO Cold Water		
• Oleophilic Sieve		

OSLO again reassessed alternative extraction processes in 1987/88 and elected to proceed with a water flotation process even though other processes claimed a potential for dry tailings and higher bitumen recovery from lower grade ores. Solvent processes were rejected because of insufficient development. The direct thermal treatment process was rejected because of concerns about scale-up, air emissions uncertainty, equipment complexity, and the inability to capitalize on the benefits associated with a high-conversion hydrogen addition process.

Pilot scale testing was done in 1989 and 1990 on three selected water flotation processes, OSLO Hybrid, OSLO Hot Water Extraction, and OSLO Warm Water Extraction Process (OSLO WWP) and subsequently led to the selection, in mid-1990, of the OSLO WWP as the new design basis. OSLO's decision to separate the mining and extraction facilities from the upgrading facilities resulted in the elimination of significant waste heat available for extraction and favoured the selection of OSLO WWP — a more energy-efficient process.

OSLO noted that concurrent with its evaluation and pilot testing of alternative extraction processes since 1984, it has been developing new cold water bitumen extraction technology. This cold water extraction process could decrease costs substantially, improve water and tailings management, increase bitumen recovery for low-grade ore and reduce energy consumption significantly. However, owing to the preliminary status of development, the OSLO Cold Water Extraction Process could not be used for the design basis. However, work is continuing on developing this process for potential commercial application.

The ERCB staff expressed concern that insufficient quantitative and qualitative data was available in the evaluation of alternative extraction processes. The ERCB staff also noted that the OSLO WWP is very similar to the modified Clark Hot Water Process and consequently has disadvantages in terms of sludge generation, disposal, toxicity, and bitumen recovery for low-grade ores. The fact that only proven technologies were given a full evaluation was an additional ERCB staff concern.

OSLO noted that the information available for comparison of most other alternative extraction processes was limited both by the preliminary state of development of the processes and the limited availability of non-confidential information. Based on these two factors, OSLO decided that neither time nor facilities were available to develop these processes to a commercial status. This decision resulted in these processes being removed from further consideration.

7.2 Proposed Process

OSLO stated that the OSLO WWP meets all the critical issues of capital and operating cost, degree of commercial readiness, resource recovery, energy utilization, water management, and compatibility with the OSLO tailings disposal strategy. It has been demonstrated on a continuous pilot plant of adequate size, tested on representative ores from both OSLO's Lease T31 and Suncor Lease 86, and scale-up is feasible. OSLO believes its process shows improvements relative to the Syncrude commercialized process. Recoveries are improved for low-grade ores and comparable for average and high-grade ores. The specific energy consumption is up to 30 per cent less than that of the existing plants. This is equivalent to a savings of 1.5 per cent of bitumen input energy or an improvement in the overall energy balance of 0.5 per cent. The freshwater make-up is also substantially reduced. Over the 35-year project life only 2.0 per cent of extraction process water make-up, 0.7 million cubic metres per year (10^6 m^3/a), comes from the Athabasca River. The process uses commercially proven equipment, requires sodium hydroxide, uses reduced temperatures in oil sands conditioning and bitumen recovery operations, and has the flexibility to vary water-to-ore ratios.

OSLO stated that the proposed process achieves the Board's bitumen recovery objective for an average oil sands feed grade, minimizes freshwater usage, and is compatible with a tailings disposal strategy that has the potential to mitigate impacts and concerns with tailings disposal and accumulation. It advises that considerable efforts have been devoted to minimize the free sludge volumes generated. The most promising methods of decreasing free sludge volumes are through a more selective mining method and novel methods of fines capture. OSLO proposes to increase fines capture, including ultrafines, by re-injection of mature pond sludge into the fresh tailings cyclone underflow (see Section 7.5). With the reduction of free sludge volumes, quicker clarification of tailings water, and faster settling of chemically treated fines, the potential for earlier water recycle is increased, which results in less freshwater make-up. OSLO feels it has made considerable progress in resolving the tailings management problems.

The ERCB staff recognizes that even though the extraction technology does not lead to dry tailings disposal and bitumen recovery may be lower than the Board's objectives for low-grade ores, the technology does work towards resolving the tailings management issue.

A.Env. staff believes that progress has been made and encourages further research and development to reduce sludge generation. It noted that research by oil sands developers should include reduction of sludge and ultrafines generation in the extraction process.

OSLO proposed to recover bitumen from tailings and free sludge in the tailings disposal area. OSLO stated that bitumen recovered from the pond has no negative effect on upgrading and will be processed through a novel froth treatment process and blended as part of the upgrader supply.

The Subcommittee acknowledged that OSLO will recover bitumen from tailings and free sludge; however, further pilot testing is required before a commercial process is implemented.

7.3 Froth Treatment

7.3.1 Process Selection

OSLO proposed a novel process for froth treatment called High Temperature Froth Treatment (HTFT). Criteria used in OSLO's process selection included safety, technical suitability, capital cost, operating cost, and technological risk. Three viable froth treatment processes were considered:

- centrifuging as used at Syncrude and Suncor plants,
- three-stage inclined plate settlers (IPS) developed by Syncrude, and
- HTFT developed by OSLO.

Following successful piloting, the HTFT process was selected for the design basis.

Centrifuges present the highest risk to personnel safety because of operator exposure to rotating equipment and hydrocarbon vapours containing benzene and H_2S. Three-stage IPS poses a much lower safety risk owing to low-pressure and low-temperature operation. However, the separation vessels contain large volumes of hydrocarbons which constitute a fire risk. The HTFT process operates at higher pressure and temperature but well within limits of technology. Volumes of hydrocarbon in separation vessels are less than in the IPS. The HTFT process is considered the most suitable process because of the flexibility to use naphtha or condensate as a diluent, thereby providing the option to buy and sell diluted bitumen during shut-downs at either the bitumen production or upgrader sites. Additionally, diluent recovery and blending facilities would also be eliminated. Bitumen recovery is comparable to that achieved with centrifuges. The product quality is improved owing to low solids content, which can significantly improve OSLO's upgrader yield. Upgrader yield is expected to increase by 3 to 4 per cent as compared to that from bitumen products from centrifuging and inclined plate settling processes. The process is the most cost-effective with savings of over 30 per cent in capital and 40 per cent in operating costs.

OSLO proposes two-stage stripping for naphtha recovery from HTFT tailings. It notes that from simulations with two stages of stripping, a naphtha recovery of 99.4 per cent is expected. This is comparable to that from alternative froth treatment processes followed by naphtha recovery units.

7.3.2 Selected Process

OSLO stated that the selected HTFT process requires further development work in a larger scale pilot plant to obtain the degree of scale-up information required for a commercial plant size design. This program would address process variable optimization and mechanical and operational issues.

The Extraction Subcommittee members believe that OSLO's HTFT process is an improvement in technology and should be encouraged. They also expect that with further pilot testing of the HTFT process and the two-stage naphtha recovery unit, bitumen and naphtha recoveries of 98.0 and 99.4 per cent respectively should be possible.

7.4 Conclusion

The Subcommittee reported that all key issues were discussed. A general agreement was reached on all issues except the following which require further investigation:

- generation of ultrafines and sludge as a function of extraction process, operating conditions, and mining grade,
- methods to recover bitumen from tailings and free sludge, and
- HTFT process piloting.

Depending on when OSLO decides to proceed with the project application and developments in the interim in the areas of regulation, technology, and economics, OSLO may be required to re-evaluate advances made in alternative extraction processes and incorporate any improvements which further resolve tailings management issues and increase bitumen recovery from low-grade ore.

7.5 Tailings Management Task Force

Initially tailings management issues were addressed by the OSLO ART Mining Subcommittee and discussed by other subcommittees, notably Extraction and Environmental. In June 1990, OSLO ART decided to deal with tailings management separately and formed a special task force composed of interested members of ART and its subcommittees known as the Tailings Management Task Force (TMTF). Subsequently, OSLO ART agreed that the TMTF information would be reported through the Extraction Subcommittee. The TMTF held three meetings, 28 June 1990, 28 November 1990, and 8 May 1991. This report summarizes key issues and topics discussed. The TMTF recognizes that the tailings design basis will continue to evolve as pilot project results and other new data become available. When OSLO decides to re-activate the project the Extraction Subcommittee recommends the TMTF reconvene.

7.5.1 Tailings Site Selection

The tailings site selection is dealt with in Section 6.3.4.

7.5.2 Tailings Disposal Design Basis

OSLO proposes a tailings management concept which results in reduced sludge volume to approximately 85×10^6 m^3 for the design basis (or about 30 per cent of that expected based on existing commercial practices). OSLO would achieve this objective by incorporating a more selective mining method, controlling tailings stream densities by cycloning, increased sludge capture by injection of mature sludge to cyclone underflow, passive deposition by spigotting, treatment of cyclone overflow, and maximization of in-pit sand and sludge storage. The final storage of all sludge would be in-pit and capped by a biologically self-sustaining lake.

OSLO's tailings disposal strategy involves initial construction of a settling pond to store process water and sludge. The perimeter dykes of the settling pond would be constructed with coarse tailings sand

and will reach a mean design height of 45 m by year 10. The sludge would be stored temporarily within the settling pond. All residual sludge would be transferred to the mined-out pit, stored below grade, and capped with fresh water. Transfer of sludge to the mined-out pit would begin about year 30.

OSLO stated that the tailings management scheme incorporates concepts to reduce sludge volumes such as cycloning, fines enrichment, and spigotting. Cycloning separates the solids in tailings into coarse underflow and fine overflow fractions. During the first 2 years the cyclone underflow would be used to construct the lower section of the settling pond perimeter dyke. The cyclone overflow would be pumped into the settling pond. This overflow would be chemically treated for rapid water clarification and the fines left to settle naturally for 2 years to a solids content of approximately 24 per cent. At this solids content, OSLO considers the fines to be sufficiently dense for sludge injection into tailings cyclone underflow. This material, called mature sludge, would be injected into the underflow and used to build dykes, and external and in-pit dumps in later years. OSLO stated that the increase in fines capture by injection of mature sludge into the densified underflow would reduce total sludge volumes. It noted that the deposition method is important in maximizing fines capture and that tranquil deposition would be achieved by spigotting. OSLO believes that this would reduce sludge volumes to approximately 85×10^6 m^3. To confirm fines capture in tailings sand, OSLO undertook a pilot program in 1991 using a cyclone and sludge injection to evaluate fines entrapment in beaches as a function of tailings density, fines content of blended stream, and method of deposition. OSLO also committed to continue assessing other methods of minimizing sludge volumes.

OSLO advised that there were two fallback positions if cycloning is not feasible. The first is to centrifuge sludge to reduce total net volume to approximately 120×10^6 m^3 and the second is a conventional tailings disposal similar to Syncrude's, resulting in 200×10^6 m^3 sludge; in both cases sludge would be stored in-pit ultimately. A.Env. and FL&W staff advised that the fallback position of tailings disposal similar to existing operations would not be acceptable in today's regulatory environment. OSLO agrees and does not consider this as a viable alternative. The Band also expressed concern with the fallback positions and the possibility of increases in sludge volumes.

OSLO stated that depending on the disposal system implemented, the area of the tailings pond and sand dump could vary as shown in Table 7-2. It estimates the tailings pond surface area using cycloning and sludge injection techniques to be 3.5 km^2 within a total tailings disposal area of 15 km^2. For the conventional tailings case of 200×10^6 m^3 sludge volume, the pond surface area could double to approximately 7 km^2 to 8 km^2 and the total tailings disposal area could increase to 18 km^2 to 20 km^2 at the same site. ERCB and A.Env. staff have not seen sufficient evidence to support OSLO's low estimates of total tailings volumes and disposal areas and therefore believe it prudent to recognize that the total tailings disposal area could be larger than what has been estimated by OSLO because of uncertainties with selective mining and dyke design and the fact that testing is not complete.

OSLO noted that tailings toxicity and sludge bulking are issues; however, it feels that these concerns are manageable through good operating and abandonment practices. The TMTF believes ongoing investigations are required on the issues of toxicity and sludge bulking by OSLO and others interested in using a caustic-based aqueous extraction process. They also note that technology needs to be developed to eliminate sludge of the type produced at existing operations.

The TMTF concluded that the OSLO proposal requires further technology development for tailings management before a confidence level can be established that would make regulatory approval possible.

TABLE 7-2 TAILINGS POND AND SAND DUMP

Physical Parameters	**Sludge Volume**		
	85×10^6 m^3 (1)	120×10^6 m^3 (2)	200×10^6 m^3 (3)
Maximum Pond Surface Area (km^2)	3.5	4.9	7-8
Pond Area Foot Print (toe-toe) (km^2)	7.2	8.6	10-12
Sand Dump (external to the mine) (km^2)	7.8	7.8	7.8
TOTAL FOOT PRINT AREA (km^2)	**15.0**	**16.4**	**18-20**

(1) Cycloning and sludge injection.
(2) Centrifuging with in-pit storage.
(3) Conventional settling similar to existing operations.

7.5.3 Groundwater Issues

OSLO discussed seepage from the tailings pond into the underlying Pleistocene channel, and seepage from in-pit tailings into the basal aquifer at the base of the McMurray Formation. OSLO's preliminary modelling found that the rate of seepage from the tailings pond to the aquifer was in the order of 120 litres per second (L/s), which indicated a potential problem. OSLO proposes to control this flow by recovery wells, cut-off walls, and/or by re-arranging the tailings disposal site south to reduce potential seepage into the Pleistocene channel. OSLO's preliminary modelling also shows that the seepage rate from in-pit tailings into the basal aquifer is dependent on clay thickness. Based on the preliminary modelling, OSLO believes the estimated flow to the aquifer in the order of 5 L/s is insignificant and there appears to be minimal environmental risk from the in-pit tailings. ERCB and A.Env. staff expressed concern about the potential risk of seepage from the tailings pond into the Pleistocene channel. OSLO assured the TMTF that it planned to re-evaluate the final location of the tailings pond when the project is re-activated.

7.5.4 Tailings Pond Sludge Reclamation

OSLO stated that the "live lake" reclamation plan involves disposal of excess free sludge stored in-pit with a deep freshwater cap. Free sludge and tailings pond water (approximately 40-m layer) would be returned to final pit bottom. This lake would be "topped up" with approximately 47 m of fresh water, could take 5 to 10 years to fill, and would be reconnected to the surface drainage system when water quality was acceptable. The near shore shallow water zone would be kept as large as possible to encourage aquatic growth. Some fertilization and biological stocking may be required. OSLO expects that biological colonization and natural detoxification would occur rapidly but may not return to reclamation "certification" state until 5 to 10 years after sludge transfer. However, it notes that this is comparable to dry land reclamation areas. OSLO acknowledges that long-term commitment to research and development will be required to verify this concept. The Band feels that if the fallback positions for tailings management are utilized, the "live lake" concept needs to be re-examined.

FL&W notes that the oil sands industry has not clearly demonstrated that the capping of sludge with water and the prevention of contamination of underground water systems is a practical long-term approach for sludge reclamation. Therefore, FL&W does not support the "live lake" concept at this time.

ERCB and A.Env. staff believe that since OSLO's project is on hold, there is additional time to continue research related to elimination of sludge formation. When OSLO decides to proceed with the project application in future, ERCB, A.Env., and FL&W staff believe that tailings disposal should be such that future proposed land use is an environmentally acceptable multiple-use dry landscape. The landscape should support forestry, vegetation, wildlife, and aquatic habitat. A portion of the mine area could be converted to a lake only if a biologically viable lake has been proven to be successful.

7.5.5 Conclusions

The TMTF noted that all key issues were discussed. Progress has been made in terms of understanding OSLO's proposed design basis for tailings management. However, the following issues require further investigation and possibly pilot testing:

- the concept for tailings management, including in-pit disposal,
- the degree of fines and ultrafines capture in tailings sand,
- the size of the total tailings disposal area,
- the ultimate free sludge volume,
- other methods of minimizing sludge volumes,
- the tailings dyke design,
- mining selectivity related to sludge volumes,
- the location of the total tailings disposal area with respect to buried channel aquifers,
- the "live lake" concept in the reclamation plan, and
- the nature and cause of tailings toxicity and impact of caustic on tailings sludge.

The information gathered from these investigations will allow for regulatory approvals based on technically sound, well-researched resolution of the issues.

8 UPGRADING

The Subcommittee was chaired by the ERCB and included representatives from OSLO, A.E., and A.Env. A total of ten meetings were held during the period November 1989 to May 1991. A list of participants in the Upgrading Subcommittee meetings is provided in Table 5, Appendix F.

The Subcommittee meetings were held concurrent with the development of the OSLO Project configuration and design basis. Consequently, the issues that were identified changed and developed with time, and became more focused and defined as the project design basis memorandum (DBM) was finalized.

The following is intended as a brief summary of the key issues and concerns, as they relate to the current design basis, raised by the Subcommittee.

8.1 Front-end Fractionation

The selected design includes conventional atmospheric and vacuum pipestill facilities which provide the required bitumen feed components for the primary conversion unit. The facilities have been sized based on a naphtha-to-bitumen ratio of 37:63. The design also includes a diluent return stabilizer, as condensate will be used as the diluent for bitumen extraction at Lease T31.

Technically, there are very few concerns related to the design philosophy and configuration of the front-end fractionization facilities. OSLO reviewed the design of the facilities in sufficient detail for the purposes of Subcommittee members.

Recently completed diluent and bitumen blending studies have confirmed a 38:62 naphtha-bitumen ratio for the diluted bitumen feed to the upgrader. Since there is only a slight difference from the previous basis, no changes to the current design are required.

Because of recent changes to the upgrading service factor, an imbalance between Lease T31 production and upgrader requirements exists which will require the sale of diluted bitumen from the upgrader site. Further project design optimization may be required.

8.2 Primary Conversion and Hydrotreating

The final primary conversion and hydrotreating design is based on Veba Combi-Cracking (VCC) technology. The DBM is a two-train design with a total bitumen feed rate of 13 100 m^3 per stream day. Design conversion is 95 weight per cent and the liquid volume yield of synthetic crude oil (SCO) is 104.9 per cent of the bitumen feed. The overall upgrading service factor is 82.7 per cent and is based on an analysis of operating and maintenance histories of comparable technologies.

The facilities design also includes an SCO stabilizer and absorber depropanizer for each VCC train. OSLO has chosen the Rutgers technology for the solidification of the VCC residue and has confirmed the operability of the process by pilot testing. Stockpiling the VCC residue is the current design basis, but OSLO intends to pursue marketing opportunities.

Most of the upgrading technology selection concerns have been addressed. OSLO chose the VCC technology as the basis for the upgrading design only after a comprehensive evaluation of the following upgrader technologies:

- CANMET,
- LC-Fining with FLEXICOKING,
- MICROCAT RC, and
- Veba Combi-Cracking.

The initial evaluation of the technologies was conducted focusing on the areas of service factor, commercial readiness, process flexibility, and process improvement capability. The next phase of the assessment considered impacts of the technology on the total project and emphasized risk, reliability, environmental, efficiency, and marketability issues. Additional Kepner Tregoe (K-T) analyses were done to evaluate licenser business proposals. Total project economics were used to assess the economic attractiveness of each technology.

The decision on upgrading technology was made prior to the formation of the Upgrading Subcommittee and hence Subcommittee participants did not have any input to the K-T evaluations. OSLO did, however, provide additional information regarding the environmental and resource utilization characteristics of the technologies evaluated. Although the information was not as detailed as ERCB staff would prefer, the data was sufficient to verify OSLO's K-T rankings and support the technology selection decision.

The results of the VCC service factor assessment indicate a much lower service factor than was originally anticipated. Therefore, concerns regarding upgrader reliability improvements are outstanding.

The project design currently provides for the stockpiling of the VCC residue. While OSLO has generally addressed the issues regarding the short-term storage of this material such as plot space allocation and contaminant leaching, longer term solutions must be developed. OSLO is doing additional testing on material handling and continues to investigate marketing options for the residue.

OSLO has provided preliminary SCO assays and is completing work on start and end-of-run samples. Although this is not expected to be an issue, the Subcommittee will need to review these results.

SCO and light ends recovery facilities have been included as part of the primary conversion and hydrotreating configuration; however, the design of these facilities has not been discussed in any detail. No significant issues are anticipated.

8.3 Hydrogen Supply

OSLO has chosen, as its current design basis, a two-train conventional hydrogen plant with Pressure Swing Adsorption (PSA) technology for purification and hydrogen recovery units to recover excess hydrogen from the high-pressure VCC purge gas. The facilities are designed for the production of 24.2 tonnes per hour (t/h) of 99.5 per cent pure hydrogen using natural gas and medium-pressure VCC gas as feedstock.

Because of the high-purity hydrogen requirements, OSLO did not have many technology options available to it for the configuration of these facilities. OSLO did evaluate an emerging technology, ICI's HEXAREF; however, it was found to be unsuitable for the OSLO Project.

The only outstanding issue related to hydrogen supply is to further investigate the use of excess by-product hydrogen currently burned by petrochemical facilities in the region. If feasible, this option would have environmental and resource conservation benefits by reducing carbon dioxide (CO_2) emissions and natural gas feedstock requirements, even after replacing the by-product hydrogen fuel value with equivalent natural gas.

8.4 Environmental Units

8.4.1 Sour Water Handling

OSLO has chosen deep-well disposal as the design basis for handling sour water. The system design includes two wells with the necessary flash and de-oiling facilities for the pretreatment of sour waters. All upgrading sour waters would be handled in one system, while brine from the crude oil desalter in the fractionation facilities would be handled in a second, segregated system.

OSLO did consider conventional sour water stripping with effluent discharge to the river; however, the option was rejected primarily on the basis of economics. OSLO considered water reuse as an option; however, the stripped sour water would not be of sufficient quality for this purpose and hence reuse was ruled out. OSLO also considered the disposal option more favourable from an environmental perspective as loading to the sulphur plant would be reduced and hence sulphur dioxide (SO_2) and CO_2 emissions would decrease marginally.

There was no significant opposition to the disposal option though it was acknowledged that deep-well disposal had its own technical and environmental concerns that will need to be addressed through the Utilities and Off-Sites Subcommittee.

OSLO was also asked to continue to consider synergies with Esso Chemical, Redwater, which may have use for the sulphur and ammonia in the sour water.

8.4.2 Gas Treating

OSLO's design basis for the amine gas treating plant is a two-train configuration with each train consisting of low-, medium-, and high-pressure scrubbers and an amine regenerator. OSLO proposed to use a 50 per cent methyl diethanolamine (MDEA) solution.

The technology selection and plant design were not identified as issues with the Subcommittee members.

8.4.3 Sulphur Recovery

OSLO chose the Mineral & Chemical Resource Co. (MCRC) sulphur recovery process as the design basis for the project. The configuration would include two units, each rated at 340 tonnes per stream day which is equivalent to 60 per cent of demand capacity. The design sulphur recovery is 99 per cent and OSLO committed to achieve 98.7 per cent on a quarterly basis which is consistent with ERCB/A.Env. guidelines for sour gas processing facilities. Based on the design sulphur recovery, SO_2 emissions from the sulphur plant incinerator stack would be approximately 11 tonnes per stream day.

Initially OSLO reviewed 52 sulphur recovery technologies from which it identified five possible candidates for which a detailed analysis would be conducted. These processes included:

- Exxon FLEXSORB-SE,
- Superclaus 99,
- Sulphreen,
- Amoco CBA, and
- MCRC.

The selected processes represent technologies capable of sulphur recoveries ranging from a minimum of 99 per cent to a maximum of 99.9 per cent (Exxon FLEXSORB-SE).

The process evaluations conducted by OSLO included discussions with licensers, visits to operating plants, a K-T analysis, and an economic analysis. The results of all analyses were reviewed with Subcommittee members.

The K-T analysis criteria and weightings were developed with the input and agreement of the Subcommittee. The criteria included a wide range of process and licenser evaluation considerations with the highest emphasis placed on operability and environmental issues. Details of the results of the K-T analysis were reviewed with the Subcommittee members and considerable discussion took place to confirm the ranking of the technologies within the various K-T criteria, in particular, the environmental criteria.

The Subcommittee agreed, in principle, with the sulphur recovery technology selection, given OSLO's design philosophy of meeting current regulatory guidelines and its design consideration for technology retrofit to account for possible changes to regulatory requirements. A.Env. and the ERCB believe that a higher sulphur recovery technology should be given continued consideration, given local airshed SO_2 loading concerns and the decision by another operator to adopt 99.9 per cent recovery in an upgrading application. OSLO noted that there is no economic incentive and believes there is negligible environmental benefit associated with the higher sulphur recovery. Further discussion is required.

OSLO's sulphur recovery unit (SRU) sparing design (2-60 per cent units) is also a concern to A.Env. and the ERCB. Although neither had a specific policy or guideline on SRU sparing, OSLO was encouraged to adopt a sparing design that would minimize flaring in the event of an unplanned SRU outage (e.g. 3-50 per cent units). OSLO evaluated five sparing options but chose 2-60 per cent units based on economics and given that the alternatives had no environmental benefit during normal operations. OSLO stated it would design its facilities in accordance with established A.Env. procedures to comply with ambient regulations. In this regard, A.Env. still requires quantitative flared emissions data for an unplanned SRU outage for each of the sparing alternatives OSLO investigated. Dispersion modelling to demonstrate compliance with ambient regulations for OLSO's design case requires further review.

8.5 Other Issues

8.5.1 Alternative Fuels Study

OSLO presented the results of its Alternative Fuels Study to the Subcommittee. The study was based on the original integrated mine and upgrader project configuration and considered the economics and environmental impact of several solid fuel options to the DBM base case of natural gas. The options considered included three coal sources and the gasification of Syncrude coke. The study results indicated that the DBM base case was clearly the economically and environmentally favoured option.

This study will need to be reviewed in the context of the current DBM to ensure the validity of assumptions and the impact of a non-integrated project. This is probably most appropriately handled by the Utilities and Off-Sites Subcommittee.

8.5.2 Material and Energy Balances

Both the material and energy balances were presented at the conclusion of the Subcommittee's current activities. A preliminary review of the material has not identified any significant concerns. Assumptions and estimates in the energy balances will need to be reviewed and integrated with the work of the Utilities and Off-Sites Subcommittee.

8.6 Conclusions

All significant issues and concerns have been raised and discussed through the Subcommittee meetings and the majority of the issues have been addressed or resolved to the satisfaction of all participants. It would appear that, in most cases, those issues that remain can be addressed, when the project is restarted, by the undertakings described in this report. The review of data and results associated with these undertakings should serve to clarify the positions of all Subcommittee members.

9 UTILITIES AND OFF-SITES

This Subcommittee was chaired by the ERCB and included representatives from OSLO, A.E., and A.Env. One Subcommittee meeting (29 November 1991) was held and several informal discussions took place between OSLO and the participants regarding selected topics. In addition, OSLO held a 1-day workshop with A.Env. in January 1991 to discuss water management issues related to the Redwater upgrader. A list of participants in the Utilities and Off-Sites Subcommittee meetings is provided in Table 6, Appendix F.

Although some progress was made on selected issues, the discussions to date served primarily to identify the interests and concerns of Subcommittee participants. The information provided to this point was, for the most part, preliminary and conceptual in nature as, at the time, the design basis for most other facilities had not been developed to the point where detailed utilities and off-site design work could proceed.

The following report highlights preliminary concerns and issues that were identified based on the information provided.

9.1 Plot Layouts

OSLO's proposed plot layout, agreed to by the Mining Subcommittee, was tabled with this Subcommittee. The layout and the explanation of design basis details addressed the ERCB's resource sterilization and facilities expansion concerns. Routing of the Lease T31 access road, pipeline corridors, and pond sizes has not been finalized and will need to be reviewed when the project is re-initiated.

A preliminary plot layout for the Redwater upgrader was also reviewed. Features that would be incorporated into the design include environmental buffers and space allocations for future facilities expansion. Space would be provided for about 8 years' storage (based on 95 per cent conversion in the upgrader) of the solidified upgrading residue. The Subcommittee requires that OSLO provide more detail on the environmental and technical design of its emergency sulphur pad and contingencies in the event of sulphur marketing problems. No other specific issues were identified although review of a final design is required.

9.2 Water Management

9.2.1 Lease T31

OSLO has provided preliminary water balances and a comprehensive water management strategy for the Lease T31 operations. The primary objectives of its strategy are to minimize Athabasca River water withdrawal and to maximize water reuse while striving for zero discharge of process water. OSLO noted, however, that if tailings dewatering were to be particularly effective, it is conceivable that some process water may need to be discharged, in which case the effluent would have to comply with regulatory guidelines. OSLO also provided information on the projected quality of proposed effluents.

The philosophy underlying OSLO's water management has been generally well received, with very few concerns or issues having been identified. Some concerns have been raised regarding mine depressurization water quality.

The ERCB has concerns regarding the use of mine depressurization water as extraction plant process water. The impact of this water quality on the process is uncertain and the ERCB believes OSLO should have contingencies in its management strategy in case the water is found to be unsuitable for this purpose. Work currently under way by the Alberta Research Council to assess the quality of this water will need to be reviewed when available.

A.Env. requires additional data to demonstrate the acceptability of the chlorine stripping process OSLO proposes for the treatment of the mine depressurization water. Water quality data from OSLO pilot testing of the process or performance experience in the literature is required.

9.2.2 Redwater Upgrader

OSLO has not completed the development of the water management strategy for the upgrader site. A preliminary strategy was reviewed at the Subcommittee meeting and additional details were discussed with A.Env. at the January 1991 workshop. OSLO's philosophy will be to maximize recycle and minimize freshwater make-up. The design would incorporate deep-well disposal to handle all sour waters and possibly regeneration wastes.

The design also incorporates a recirculating cooling water system, although OSLO intends to maximize the use of airfin cooling when possible. When asked to consider a once-through cooling water system, OSLO explained that the process had been rejected because of the potential for contamination in the event of a high-pressure oil leak. To account for such potential would require considerably oversized de-oiling facilities. OSLO will be required to demonstrate the technical and economic viability of alternatives to the cooling tower system.

There were no specific objections to the proposal for deep-well disposal of sour waters; however, additional review of a more detailed design will be necessary to confirm acceptability. OSLO will also be required to revise earlier studies regarding the impact of upgrader effluents on the North Saskatchewan River, as the original studies included a treated stripped sour water effluent.

The design of the river water intake structure will require review with the Fish and Wildlife Division of FL&W and the appropriate federal authorities. OSLO was advised that withdrawal restrictions can be expected to be applied during conditions of low river flow.

The design of the process and run-off water ponds on the site will need to be reviewed when available. A.Env. has advised that all ponds, with the exception of the raw water pond, will require liners. OSLO will also need to develop plans for the removal of silt from the settling ponds; return of the silt to the river is discouraged.

9.3 Steam, Fuel, and Power

9.3.1 Steam Systems

The current design for the Lease T31 steam systems includes nine gas-fired package boilers, each rated at 91 t/h, plus two spares. The system is required to provide 770 t/h of 21-megapascal superheated steam. Final steam requirement balances will need to be reviewed as there were questions related to the design basis relative to the extraction plant design.

The steam generation facilities for the upgrader would include two systems, a utility system and an upgrading conversion system. The utility system design includes three to four gas-fired package boilers, each rated at 91 t/h. The upgrader conversion steam system would include two unitized facilities (one for each upgrader train) which utilize process steam to generate power.

No significant issues have been identified concerning the proposed steam systems.

9.3.2 Fuel Requirements

As noted in Section 8.5.1, OSLO has completed an alternative fuels study which indicated that natural gas is the environmentally and economically preferred fuel. OSLO feels the overall study conclusions are even more valid based on the current non-integrated project configuration. Subcommittee members request that the study be reviewed in the context of the current design basis to verify the assumptions used and to assess what the impact of the non-integrated configuration might be.

OSLO's current design basis uses natural gas as the fuel. OSLO estimates about 340×10^6 m^3/a of natural gas is required for Lease T31 and another 740×10^6 m^3/a is required for the upgrader.

OSLO has been requested to comment on a gas supply alternative for Lease T31 that has been proposed by a producer in the Liege area, west of Fort McMurray.

9.3.3 Power Requirements

OSLO estimated the power import requirements for Lease T31 and the upgrader at 47 megawatts (MW) (63 MW peak) and 40 MW (47 MW peak) respectively. Another 20 MW is required at the upgrader and will be generated on site using steam turbines in the upgrader conversion steam system. Although not in the design basis for Lease T31, considerable interest has been shown by third parties regarding cogeneration opportunities. This is likely to be a future enhancement to the design.

The ERCB requested a review of the final design basis requirements and facilities to identify any possible issues, particularly if cogeneration becomes a part of the design.

9.4 Other Issues

Overall energy balances will need to be developed and reviewed with comparison to existing operating facilities.

A.Env. requests that CO_2 and nitrogen oxide (NO_x) emissions projections be developed for review. OSLO has studied potential ways to reduce greenhouse gas emissions from the project but has not reviewed the study with the Subcommittee.

9.5 Conclusions

Much of the information reviewed by the Subcommittee to date has been preliminary. Subcommittee members have highlighted relevant standards and regulations, as well as general areas of concern, to aid OSLO in the development of an acceptable design. No significant concerns with OSLO's design philosophy and approach have been identified. The Subcommittee recommended that, when the project is restarted, the final design basis and supporting background material be reviewed to ensure that all issues and concerns have been identified and addressed.

10 FORT MCMURRAY AND REGION INFRASTRUCTURE

The purpose of this Subcommittee was to assess the impact of the OSLO Project on the infrastructure, services, and citizens of the City of Fort McMurray and region within the socio-economic areas of:

- employment and business opportunities,
- education requirements,
- social services (including issue of mental well-being),
- economic impact (taxation, revenue sharing, etc.),
- protective and medical services,
- recreation services and opportunities, and
- infrastructure requirements.

The objective of the Subcommittee was to develop a process which would address the socio-economic impact of the OSLO Project with emphasis being placed on identification of issues, establishment of appropriate action for mitigation or resolution, and the communication of the results to OSLO ART and other relevant authorities.

Representatives from Alberta Municipal Affairs attended the initial meeting and remained a part of the process through receipt of minutes and other methods of communication, as appropriate. A list of participants in the Fort McMurray and Region Infrastructure Subcommittee is provided in Table 7, Appendix F.

The Subcommittee organized two forums through which a community position and a commercial position were developed. Through these forums, considerable information was gathered for use in the socio-economic impact assessment for Fort McMurray and region.

It should be noted that impacts specific to the community's education system have primarily been considered outside of the forums. Therefore, only the social aspect of this area has been covered. It is worthy of note, however, that within the education area, considerable emphasis was placed on the need for proactively addressing both infrastructure and program development needs associated with the OSLO Project.

10.1 Community Forum

10.1.1 Recreation Services and Opportunities

The Subcommittee for recreation consisted of eight members which met for three sessions. Their recommendations were developed through discussion and reflect a consensus on how the issues should be addressed.

Recreation priorities fell into three categories: high, medium, and low. Their impact with regard to OSLO was given four categories: severe, moderate, low, and none. In order to clearly communicate priorities and impacts, they are listed as follows: high priority/severe impact; high priority/moderate impact; high priority/low impact; high priority/no impact.

High Priority/Severe Impact

1 Urban Park Development: This was identified by the Subcommittee as strongly related to "quality of life" in that although Fort McMurray is surrounded by forests and open space, there is a high degree of difficulty accessing these areas. Urban park development, if construction is not completed within the recommended time frame, will cost more and be of a lower quality.

Recommendation: Ensure that the construction time frame be identified to the Province as a high priority with funding being secured in the time frames necessary to accommodate same.

2 Facility Debt Load (upgrading and development of new facilities): Includes consideration of cost of operating existing facilities and need for new sports fields. It has been recognized that these areas of development are closely intertwined owing to financial constraints. Therefore, there is a need to develop a 20-to-25-year plan, develop a formula and monitoring procedure to establish maximum debt load of all parties, and identify and develop new sources of revenue to assist in debt load retirement.

Recommendation: Prior to OSLO development, the issue of the Industrial Tax Transfer be resolved, efforts be made to increase the tax base, and OSLO's commitment to the community be identified (e.g. Syncrude/Suncor community commitment).

3 Upgrade and develop Gregoire Lake Provincial Park to a standard that provides ready accessibility to the community for swimming, boating, family camping, etc., by improving water quality and accommodation (i.e. campsites). The impact OSLO will have is to create a larger population that cannot be accommodated by the park which could result in permanent damage to this resource.

Recommendation: Alberta Recreation & Parks should investigate the feasibility of an additional park which could provide waterfront recreation and camping access, and ensure that the existing resource is protected from overuse.

High Priority/Moderate Impact

4 Environmental Protection: The increasing awareness and environmental consciousness of residents bring to the forefront the need to protect against pollution, overuse, and disruption of wildlife habitats. It was felt that there is a need to educate short-term and new residents about local environmental issues to ensure they share the same awareness as those committed to the community for a longer term.

Recommendation: Industry and community to develop awareness, pride, and ownership, particularly in the urban park, through support of park environment and encouragement of employees to become involved within the community.

5 Upgrading of Sports Fields: It was agreed that current fields do not meet the City's needs and many are below acceptable user standards. Although OSLO will have only a medium impact, it is believed that upgrading of sports fields in conjunction with new development is essential.

Recommendation: Develop a plan (include users) and establish standards. If the requirements exceed the capacity of available lands, an investigation should be implemented with regard to designation of additional lands for park development. Assess user needs and identify investors.

High Priority/Low Impact

6 Neighbourhood Parks and Youth Centres: It is believed that facilities, other than sports and others used for highly structured programs, are needed to curb teenagers milling and congregating in arcades and malls.

Recommendation: Utilize parent volunteers. Solicit and review proposals from the various neighbourhoods to set up programs on a trial basis. As existing boards are overextended, assess the feasibility of hiring a community coordinator. Investigate possibility of utilizing community schools or other existing facilities.

7 Volunteer Resources: With an increasing need for volunteer resources, it is believed the extra burden and operational funding shortages can lead to "burnout" when volunteers' efforts have to be diverted from services and programs to fund raising. With the advent of OSLO, it is hoped that more people would result in new volunteers. However, this is not necessarily the case; often short-term residents choose not to get involved with the community.

Recommendation: There is a need for volunteer development, and to view volunteers as a limited resource and invest in a support system for volunteers.

High Priority/No Impact

8 Physically Handicapped Access

Recommendation: A review be made of all existing facilities, in conjunction with local organizations, to upgrade existing facilities in order to make them accessible to all. Barrier-free access should be the norm when planning a new facility.

Medium Priority/Low Impact

9 Unstructured Recreation Opportunities: Should be addressed through the Urban Park Development and the Recreation & Culture Master Plan. Sports and recreational groups should be encouraged to provide equipment (rental) for unstructured activities, thus providing a source of revenue. Unstructured activities can be developed within neighbourhood parks.

10 User Fees: Increased costs are making accessibility to some programs/facilities out of reach for low-income families. Standards should be set for programs/facilities and where "public" monies are used, access by all sectors of the public should be feasible.

11 Field House (a multi-use facility for year-round activity): Large-capacity facilities which can seat more than 1500 people.

Branch Library, Timberlea: It is recommended that a long-term plan be set out which would address a population increase within the Timberlea subdivision by looking at possible partnerships with school systems. The impact OSLO may have on the project would be based on population growth. However, an increased tax base would partially offset the increased service level requirements.

Centennial Pool: It is recommended that the Centennial Pool life expectancy be analysed. Once this analysis has been completed, develop a plan and standards. Based on population standards, there may be need for more pool development.

Medium Priority/No Impact

The areas listed below are part of the ongoing upgrading of facilities and opportunities within Fort McMurray. Whether or not OSLO is under construction has no bearing on what the Subcommittee feels the City requires as a whole in the following areas: art gallery and museum, playground and other equipment, multi-agency facility, and townsite arena replacement.

Low Priority/No Impact

12 Beacon Hill Arena: It is recommended that the life expectancy be monitored through ongoing maintenance and operational reviews. At this time it is believed that the arena would not need to be replaced during OSLO development.

13 Ski Hill: It is considered necessary to develop standards and a long-term plan to resolve the issues of water, lighting, erosion, equipment, and facilities, prior to the 1992 Alberta Winter Games. It is believed service levels, because of OSLO development, could be affected by increased usage.

14 Trendy Sports Facilities: Leave to private enterprise. However, the City should investigate and assist based on demand.

10.1.2 Transportation

With an OSLO workforce of approximately 1200 people in the Fort McMurray region, the city of Fort McMurray will probably see an increase in population of up to 5000 concentrated primarily within the Timberlea and Thickwood area. This growth would be enhanced significantly should the expansion plans of Suncor and Syncrude move ahead.

Based on the population growth being predicted, OSLO commissioned UMA Engineering Ltd. to analyse and prepare a report on the movement of goods and personnel between Fort McMurray and its plant site. The various options are summarized as follows:

Corridor A: Minimum upgrading of Highway 63 north of the city. Upgrading would consist of one additional lane in the peak direction to the Syncrude access road. Construction of a two-lane, all-weather road to the OSLO site from Syncrude would be required.

Corridor B: Access via the east side of the Athabasca River would demand the construction of a crossing over the Athabasca River or Clearwater River plus a two-lane, all-weather access road to the OSLO site.

Options B1 and B2:	Commencing south of the city on a circuitous route north. This is not considered feasible after a cursory analysis, since the projected residential growth would be in the Timberlea area.
Option B3:	This would require construction of a crossing in the lower townsite of the Clearwater River adjacent to the Snye. This option is adequate to a population level of 47 000; however, once the population increases to 60 000, an additional river crossing would be required to alleviate congestion within the lower townsite.
Options B4 to B6:	These options would require the construction of an Athabasca River crossing north of Fort McMurray; however, only two intersections of Highway 63 would be affected by the increase in traffic flow at Thickwood Boulevard and Confederation Way.
Summary:	With the implementation of Corridor A or Options B4, B5, or B6, the OSLO impact on the City's transportation system would be minimal. However, it should be recognized that a second Athabasca River crossing, as outlined above, may be required when the city's population nears 60 000.

10.1.3 Protective and Medical Services

Regardless of the magnitude of the growth of OSLO, the members of the Subcommittee believe the issues of staffing will pose a challenge. Retention of staff, specifically nurses and paramedics, is a high priority and the Subcommittee feels that maintaining a collaborative relationship with Keyano College and various universities must be continued.

Recruitment will need to be actively pursued, especially in the areas of emergency, intensive care, and operating room staffing. Faster placement and internships using the joint efforts of all affected agencies will be required. The need for training and skill development is also of a high priority, and development of in-house training programs will assist in meeting needs in critical care.

The impact of OSLO will not only be reflected in staffing requirements but also in the areas of upgrading and expanding facilities and equipment. With an increase in population, the existing resources will be overtaxed and concerns are as follows:

1 Protective Services: Maintaining a sufficient level of service, overcrowding of existing bars and night clubs with increasing construction activity generally leading to increased alcohol and drug abuse, increased domestic violence, bar fights, and vehicular and industrial trauma.

2 Communication: Repeater towers for radio coverage from Fort McMurray to the OSLO site. OSLO teams will be required to work closely with the City in providing specific projected demographics of the project with regard to population and construction influxes (short-, medium-, and long-term). This close working relationship with the City should be expanded to existing industries, thus creating an integral network of support, disaster planning, etc.

3 Fort McMurray Regional Hospital: High priorities are given to the retention and recruitment of nurses and paramedics, and training and skill development in critical care.

In addition, the need for long-term care for the city and surrounding areas is of a critical nature. A proposal for a long-term, multi-level facility has been presented to Alberta Health and, while approval in principle has been given, financial approval is awaited.

Finally, space is a high priority in the areas of parking, emergency, ambulatory care, rehabilitation, and storage needs.

4 Mental Health Services: Recruitment and staffing are a high priority within the mental health service. With a chronic shortage of psychiatrists and mental health professionals within Canada, the City will have to compete with cities which offer more attractive locations and benefits. History, such as construction of Suncor and Syncrude, has shown the impact of OSLO on Fort McMurray could give rise to increases in depression, suicide, family violence, and a sense of loss of family. These issues must be fully addressed. The Canadian Mental Health Services Association firmly believes that OSLO, as a community member, should be encouraged to assist the City to negotiate for additional funding from government in preparing for additional demands on its services.

5 Alberta Alcohol and Drug Abuse Commission (AADAC): Here, as in other areas, the high priority is for staffing. Past experience of Syncrude and Suncor expansions and shut-downs has shown that an influx of manpower creates an immediate additional demand for AADAC and Pastew Place Detoxification Centre services.

A contributing factor to alcohol and drug abuse is separation from families, living environment (camp), long working hours, and the need to relax. As with mental health services, the situation with alcohol and drug abuse will subside once the need for crisis intervention declines.

In summary, the need to carefully develop a financial strategy for an OSLO expansion is clearly evident, as all areas of Protective and Medical Services rely heavily on third-party funding (provincial, federal or local support). It must be remembered that funding does not necessarily expand with increased volume and must be negotiated separately. Funding decisions, from a local level to a provincial cabinet level, should be made prior to any impact OSLO will have on the community.

10.1.4 Social Services

Several areas of concern which could be addressed within this section of the report have been covered under Protective and Medical Services (e.g. funding, staffing, voluntarism, and lack of facilities for adolescents such as neighbourhood youth centres and alcohol and drug abuse). Additional areas of concern which have been identified are outlined below.

1 Public and Separate School Districts

High Priority/Moderate Impact

Counselling for Behavioral Problems, Social Difficulties, and Depression: While having been addressed under the Protective and Medical Services section of this report, these issues within the school system are somewhat different. If there is an influx of students within the system, counselling time for each student would be severely limited.

Recommendation: OSLO may wish to subsidize a trained counsellor for a smaller school which would then allow a similar position to be opened in other schools on a full-time counselling basis, and OSLO, through its resources, assist with the recruitment of counsellors.

Medium Priority/Severe Impact

2 Special Education Programs: While existing services and programs are considered to be highly successful, a problem exists because of the number of people on waiting lists to enter these programs.

Recommendation: OSLO personnel be made aware, well ahead of their arrival, of the need to contact student services within the district. This will enable the district to prepare to meet the requirements of exceptional and/or special needs learners. It must be realized that program placements, teacher aide assistance, and special education funding are assigned early in the year so this initial early contact by parents will expedite acquisition of necessary assistance.

3 Women's Crisis Centre (Unity House): While funding and staffing have been addressed previously, a need has been identified in public education and awareness. It is firmly believed that education is the first step towards prevention.

4 Family Community and Support Services

High Priority/Low Impact

5 Family Violence and Sexual Abuse: A local program for this problem is non-existent within Fort McMurray. It is recommended that a clinical program be established specifically to treat abusers and victims.

6 Alienation of Native Children Within School and Social Settings: Establishment of specific programs, designed and implemented by Native organizations, which identify Native children's needs and culture.

Medium Priority/Low Impact

7 Adolescents and Petty Crime: It is believed that the establishment and operation of a treatment program would serve as a diversion from the court system.

8 Day Care Services: There is inadequate day care for parents on shift work and a potential shortage of day care space. It is recommended that, in order to determine the impact of the issue as it relates to the needs of shift workers, the community should identify which type of program would best accommodate shift workers and ensure OSLO examines the impact of shift work on children and families.

Recommendation: Monitor day care space requirements; public sector to accommodate this as business expansion, and any shortfalls be covered by government-operated programs.

Medium Priority/Low Impact

9 Housing: As seen in the past, e.g. during Syncrude construction, there will undoubtedly be a significant increase in rental rates and housing costs within the city. Problems will arise where the family unit is headed by a single parent and/or unemployed person. It is recognized that additional low-income/subsidized housing will be required.

Low Priority/Moderate Impact

10 Homeless and Transients: While at this time this can be seen as a low priority, there is a definite need to have a shelter constructed to meet future needs. Again, an increase in the number of homeless and transient people can and will cause a strain on all areas of the City's social programs.

Low Priority/No Impact

11 Foster Parents and Homes for Adolescents: Shortage of foster homes is an ongoing problem which may be exacerbated by the OSLO Project.

10.2 Commercial Forum

Key issues identified within the commercial sector of OSLO's SEIA are somewhat similar to those of the community forum and are listed as follows:

1 Modularization: Maximization of construction on site, and in Fort McMurray.

Recommendation: To the extent possible, concentrate construction efforts in the Fort McMurray region.

2 Utilization of Existing Business Community Resources: Feasibility of developing organizational infrastructure within the city rather than at plant site.

Recommendations:

- Actively promote a partnership concept by providing easy access to data regarding justification of cost, etc.,
- encourage input on how the business community, through education, can participate, and
- promote Fort McMurray's business community as a viable option based on expertise and long-term economic benefits (e.g. repairs, shut-downs).

3 Camp or Fort McMurray Housing and Transportation During Operations: Issues are identified as increased movement and impact of people within Fort McMurray, and detrimental impact of plant site camps to the community, as they hamper growth and offer no benefits to the community.

Recommendations:

- Utilize empty housing within Fort McMurray rather than a housing camp,
- offer transportation incentives, thus allowing more work to be done locally, and
- synchronize shut-downs between the plant sites which would keep the workforce in Fort McMurray year-round.

4 OSLO Bidding Process: Key issues identified are a need to offer better opportunities to local businesses in the bidding process, out-of-town construction consultants over local consultants, lack of communication between out-of-town consultants and local businesses, and difference in costs, due to location and overhead, of out-of-town maintenance contracts to that of local contractors, i.e. local contractors may pay more for property taxes, services, water, and power.

Recommendations:

- Chamber of Commerce to provide a Fort McMurray Commercial Directory for easy access,
- OSLO to make available: directory of key personnel, contractor lists, company policies with regard to contractors, job requirements (advising schools of what skills are required in order to initiate job training within these areas), and training requirements,
- Chamber of Commerce and the City's economic development officer to arrange seminars on quality and service requirements, and
- City to promote: a local hiring hall, a forum for regular discussion with industry on local business opportunities, institution of a local purchasing office, setting up an Ombudsman Board, possible subsidy of minor contracts, and a quota system on hiring — a system to ensure that all local qualified people are identified and given priority for employment.

5 OSLO's Plan for Fort McMurray's Industrial Growth: Key areas of concern are: need to ensure OSLO's systems are compatible with the business community, how to influence out-of-town contractors to subcontract locally, the community being prepared and taking a proactive approach, and the community understanding OSLO's requirements.

Recommendations: Key to all areas is "communication". Where it is OSLO's need to keep reinforcing quality, service, safety, etc. by defining its needs, it will be the business community's responsibility to ensure they know the ground rules and keep communication lines open at all times. The onus is on all parties to promote Fort McMurray as "a good place to live" to prospective employees and professionals.

10.3 Conclusions

From a community aspect, there will be a significant impact on social and recreational services within Fort McMurray. As past experience has taught us, the migration of large numbers of people puts a strain on all social services. In addition, the need for recreational services is also increased and the pressure on existing facilities and natural resources will be significant.

The commercial sector's view on the OSLO Project is that impacts will be largely beneficial as this will bring economic development, through diversification, to the Fort McMurray region.

While there may be areas of conflict, both sectors agree there is a definite requirement to develop plans and strategies in order to alleviate as many of the adverse social impacts as possible while, at the same time, capitalizing on the potential social and economic benefits.

In addition to the information gathering inherent in the two forums, the local Subcommittee has been provided, and has capitalized on, the opportunity to exchange information, ideas, and concerns with both OSLO and other affected parties on an ongoing basis. Overall, the OSLO ART process has been extremely beneficial to the community in helping it proactively address the issues associated with OSLO development.

Start-up Considerations:

Upon re-initiation of the OSLO Project, the Subcommittee wishes to highlight four areas that should be immediately addressed.

1 ERCB should re-initiate OSLO ART.

2 All affected public sector groups in the Fort McMurray region need to coordinate an integrated approach to government relative to their capacity to fund infrastructure and other requirements emanating from an OSLO Project. While this joint approach would be unique, it should provide a forum conducive to achieving the most positive results, from both local and provincial government perspectives.

3 The OSLO SEIA should be expanded to include further identification of responsibility for mitigative measures or action. At a minimum, the parties with primary responsibility should be identified, as well as those with secondary or lesser responsibilities. Further, there should be assurances that the respective parties are prepared to accept the responsibilities identified and to manage required actions in a timely and responsible fashion.

4 OSLO should, once again, open a local office to facilitate all aspects of communication with the communities in the Fort McMurray region.

11 ABORIGINAL ISSUES

The Aboriginal Issues Subcommittee (AIS) was set up in early 1990 by the OSLO ART to provide a focused forum to discuss and address a range of Aboriginal issues surrounding the proposed OSLO

Project. This Subcommittee was chaired by an ERCB designate, was composed of representatives from the region's Aboriginal communities, Fort McKay, provincial and federal departments, and OSLO. A list of participants in the Aboriginal Issues Subcommittee meetings is provided in Table 8, Appendix F. Throughout 1990-91 AIS has met twelve times, almost always in Fort McMurray.

The AIS has provided a regular meeting place for many of the parties interested in maximizing Aboriginal participation in the OSLO Project, especially with regard to employment, training, business, and related planning issues.

The Subcommittee's Terms of Reference were as follows:

- To identify financial, cultural, economic, social, education, training, and employment barriers limiting Aboriginal participation in the OSLO Project and the regional economy, and to recommend to OSLO ART ways to address these issues.
- To identify business opportunities, business development support services, and Aboriginal business equity and loan financing requirements in the region and recommend to OSLO ART ways to address these issues.
- To review and address the industrial benefits and human resource plans of OSLO so they may benefit.
- To examine the effectiveness of current and future federal and provincial government policies, programs, and services, and to recommend to OSLO ART how they should be coordinated, adapted, and delivered in the region in order to maximize Aboriginal participation in the OSLO Project.
- To identify and recommend to OSLO ART ongoing mechanisms such as multi-party agreements and/or other arrangements to ensure firm, long-term objectives, and financial and other cooperative commitments on the part of Canada, Alberta, OSLO, and the Aboriginal representatives to maximize Aboriginal participation in the OSLO Project.

The AIS has conducted its work by holding regular meetings:

- providing critical comment on OSLO's Industrial Benefits and Human Resources Plans as they might affect Aboriginal people,
- providing a discussion forum on all issues related to maximizing Aboriginal economic participation in OSLO and the regional economy,
- organizing and documenting an Aboriginal Issues Workshop for representatives from the 11 Aboriginal groups in the region, governments, and industry (about 100 people attended),
- assisting in the development of agreements or "a road map" between OSLO and the Aboriginal communities with regard to planning and participation before and after any project application and hearing,
- discussing and evaluating current ongoing Aboriginal participation issues in the region's economy which exist apart from the OSLO project, and

- the chairman visited some Aboriginal communities with OSLO, when the project suspension was announced, to clarify the AIS process and the use of the Aboriginal Workshop material.

This summary is a reflection of the highlights of the Aboriginal Issues Workshop held in Fort McMurray on 25-27 June 1990. The Workshop Report was reviewed and prepared by the Athabasca Native Development Corporation and their consultant, Shipley Management Services. It includes workshop recommendations and written material and recommendations from the ANDC board, staff, and advisors. Both the workshop and the ANDC indicated where they felt the primary responsibility lay to implement the various recommendations. The full report is included in the OSLO ART Interim Report documentation.

11.1 Issues, Barriers, and Recommendations

Issues, barriers, and recommendations are presented under four headings: Community Development, Business Opportunities, Employment, and Education.

11.2 Community Development

The list of issues contains several perceived deficiencies within the Aboriginal communities. The following list groups the identified issues into broad categories. These include:

- inadequate funding for community services and infrastructure to support development,
- insufficient funding from government for governance, services, and programs in Aboriginal communities,
- short-range planning and inadequate coordination of government programs,
- insufficient community participation in preparing and planning for its own needs and for OSLO,
- inadequate resources and personnel for community social development,
- lack of appropriate outside support resources to assist community,
- need for stronger, knowledgeable community leadership and governance,
- worry about quality of community life and stability,
- powerlessness — 30 workshop statements began with the phrase "lack of ..."; people did not seem to feel they had any control of their community or their own future, and
- concern over social ills such as alcoholism, prejudice, and conflict.

Most of these types of issues were seen as the primary responsibility of the community and the governments, not industry. The resolution of these issues lies with a joint initiative of all parties.

11.3 Business Opportunities

The following business opportunity issues were identified:

- need for easily accessible local sources of loan and equity funding for Aboriginal business,
- need for a substantial increase in equity and debt financing for Aboriginal business,
- lack of any community financial base to build businesses,
- Aboriginal businesses without much business, management, or competitive industrial experience,
- need for early information and time to respond,
- need for professional support services and training of all kinds,

- need for firm opportunity commitments from OSLO and government,
- need for corporate commitment to reduce barriers and provide practical education and some sole source contracts, and
- need for business planning to be organized to take Aboriginal culture, level of expertise, and community realities into account.

Business-related issues were seen as the primary responsibility of the entrepreneurs, Aboriginal leadership, governments, and industry.

11.4 Employment

The following employment issues were identified:

- need for firm targets, commitments, strategies, and resources from industry for jobs for Aboriginal people,
- need for a range of employment support services including those directed by Aboriginal organizations,
- need for continuous communication and consultation between industry, government, and the Aboriginal communities,
- need for Native staff and cross-cultural training for all OSLO employees. This also applies to training institutions and local businesses,
- hiring should be based on qualifications and not nepotism,
- qualifications should relate to experience as well as education,
- long-term planning information is required by each community,
- communities require feedback on what happens to their ideas and suggestions,
- OSLO to design and implement an equity employment program in conjunction with Aboriginal organizations such as the ANDC, and
- additional funding is required to deliver Aboriginal support services.

Employment issues were seen as the primary responsibility of communities, Aboriginal organizations, governments, and OSLO.

11.5 Education

The following educational issues were identified:

- need for more in-community training and less relocation,
- the quality of education in the community must be improved,
- more discussions between Northlands School Division and the community must take place on a variety of issues,
- there must be more parental involvement in education,
- more support services for students are required to keep students in school,
- better communication is required between community groups and the various educational authorities,
- the relationship of education to employment needs to be better defined,
- community people need to be more aware of the opportunities and programs that are available,
- Aboriginal faith and confidence in the educational process and its results needs to be strengthened,
- Aboriginal culture needs to find a larger place in community education, and

- there are a number of administrative types of issues that require attention such as staffing, curriculum, standards, funding, and testing.

Education issues were seen as the primary responsibility of the communities, educational institutions, and the governments.

11.6 Additional Issues Identified by the AIS

This section reflects some of the non-OSLO AIS discussions which occurred during the various committee meetings.

The ANDC and the Athabasca Tribal Council (ATC), which represent the interests of the region's Status and Metis residents, raised a number of issues which were discussed by the AIS. The AIS believes that these are important issues and need to be included in this summary.

1 During the initial development of the AIS terms of reference, the issue of Aboriginal participation in the industry-government project discussions was raised. It was the original view that they should have a seat in the discussions about financing and other terms or conditions applied to the project. The project was occurring in their area, they would experience the major impacts, and their Aboriginal way of life was at stake. This case was emphasized most by Fort McKay, the nearest community to the OSLO Project site.

This issue of Aboriginal participation in industry-government negotiations outlining their respective obligations may have to be revisited whenever the OSLO application process is reinstated.

2 The ANDC and ATC were very concerned about what would happen between the filing of the AIS and OSLO ART reports and the actual application and hearing dates. Community needs would not stand still and the need to plan and prepare for the project would not cease. If Aboriginal people had to wait until after the decision to build the project was made, they would be unable to do the necessary planning and development of funding and services. As a result, they would not be able to take maximum advantage of the project's identified benefits.

It was clear to the AIS that some interim arrangement was required to assist the Aboriginal organizations and communities during this "before-project construction" time period. The purpose of the "road map" exercise was to try to begin to address this concern.

3 The ANDC and the ATC were also concerned that OSLO made many commitments and, while OSLO's intentions were generally believed, nothing was in any written agreement form. The AIS supports the need for Aboriginal people to have some written agreements, involving all parties, tailored to each particular OSLO Project phase, which outlines the goals, objectives, policies, financial commitments, consultation mechanisms, and implementation strategies that would be followed. OSLO assisted the Aboriginal organizations to develop such a "road map" for future use. It is included as Appendix D of the Interim Report of OSLO ART.

4 Another ANDC and ATC concern focused on the lack of commitments of the two levels of government to act on the Aboriginal concerns and needs that were in their areas of

jurisdiction. It was felt that government as well as industry needed to make their policy and funding commitments up front.

While government representatives were sympathetic to the Aboriginal concerns, it was clear that many government commitments and actions would not be taken until there was an actual project. In the interim period, ongoing and new government programs would continue to deal with the various issues.

5 In order for Aboriginal people to participate as full partners in all aspects of development, the communities and Aboriginal organizations require consistent, long-term government funding arrangements. This is required both to maintain and develop Aboriginal competence and for them to acquire the professional support they need.

It is not certain that both government and industry can marshall the staff, expertise, and resources necessary to deal with large oil sands developments. However, it is obvious that the region's Aboriginal people need lead time, resources, and the cooperation of OSLO and governments to prepare themselves to participate and to develop programs to meet their needs. They also need these supports to properly participate in the planning and review of large, complex projects such as OSLO. These difficult issues require the whole-hearted cooperation and resources of all involved parties.

11.7 Recommendations

- That the participants in the OSLO ART process consider assisting and financing the development of some type of interim, regional Aboriginal planning and problem-solving forum. This body could be similar to the Fort McKay Interface Committee but would assist all Aboriginal groups in dealing with current as well as proposed industrial developments and government policies and programs. It would focus and follow up on the various Aboriginal issues identified during the Aboriginal Issues Workshop and the OSLO ART process.

- That the ERCB or some other government departments such as the Indian Northern Affairs of Canada and the Canadian Employment and Immigration Centre or A.Env./A.E. act as the catalyst to bring the involved regional parties to a planning workshop. The workshop should include regional Aboriginal groups, government departments, industries active in the area, and other interested parties. The goal would be to create a working arrangement that could assist in dealing with employment, training, business, and community development issues.

- The Aboriginal Issues Workshop Report, including its recommendations and the major points raised by the AIS, be discussed and checked with all the Aboriginal groups in the area prior to any restart of the OSLO Project.

- That the beginning OSLO-Aboriginal "road map" be reviewed, discussed, and acted on prior to any restart of the OSLO Project. This is to emphasize that the "road map" is a set of ideas in the process of being developed. The "road map" could be used as a means of reaching the objective of an agreement.

- The extensive work of all the OSLO ART committees as evidenced in the 26 June 1991 Forum and Interim Report is not well known to many Aboriginal people in the Fort McMurray region. Prior to any restart, it is suggested that the ERCB or some other government agency update the Aboriginal people on the work accomplished and clarify the next OSLO ART process and Aboriginal involvement.

12 ENVIRONMENT

The OSLO ART Environmental Subcommittee held eight meetings between 27 November 1989 and 12 December 1990. The seventh meeting on 28 June 1990 was a joint meeting and workshop on tailings. A list of participants in the Environmental Subcommittee meetings and workshop is provided in Table 9, Appendix F. The Subcommittee also participated in five OSLO-sponsored biophysical EIA workshops. Some members also participated in other elements of the public consultation process for the OSLO Project.

12.1 Role of the Environmental Subcommittee

Responsibilities for addressing environmental issues were accepted by all the OSLO ART subcommittees. Each subcommittee addressed environmental questions which fell within the focus of its activities. For the Environmental Subcommittee, however, environmental issues were the focus of subcommittee activities.

The role of the Subcommittee, put most simply, was to examine the OSLO Project and the project planning process from an environmental perspective. The Subcommittee provided a forum for the discussion of the overall environmental assessment process of environmental issues and composite biophysical impacts, and of plans for the preparation of an EIA report.

The Subcommittee was responsible for assisting OSLO in the identification of significant environmental issues and ensuring that these issues were addressed in project planning through the EIA review process. In theory, an additional responsibility of the Subcommittee was to provide assurance that appropriate emphasis is placed upon meeting environmental objectives. However, given the importance attributed to environmental issues by OSLO planners and other subcommittees, this was largely a nominal task. The Subcommittee reported that no major differences between the approach to key environmental issues taken by Mining, Extraction, Upgrading, and Utilities and Off-Sites Subcommittees and the Environmental Subcommittee were noted.

Subcommittee activities to date emphasized the review of the biophysical assessment process. The overall EIA process, however, contains two fundamentally linked components — the biophysical assessment and the SEIA. The socio-economic issues and biophysical issues associated with major development are linked by the requirements of the EIA process, by the umbrella-like role assigned to A.Env. under the EIA process (and OSLO ART), and by the complex interaction between quality of life- and health-related socio-economic issues and biophysical impacts and mitigation measures. The Environmental Subcommittee's responsibilities to review and report on the overall EIA process therefore required that both the biophysical EIA and the SEIA processes be addressed.

In April 1991, the OSLO owners decided to complete the current design basis engineering phase, but not to file an ERCB application. Considerable progress has been made in the definition of a project design and project impacts and OSLO has prepared a significant portion of a draft biophysical EIA, including the following documents:

- Issues Scoping Report, Part I: Lease T31 — Bitumen Production Facilities
- Issues Scoping Report, Part II: Redwater — Upgrader

- Baseline Report, Part I: Lease T31 — Bitumen Production Facilities
- Baseline Report, Part II: Redwater — Upgrader

The Subcommittee addressed socio-economic issues primarily in the initial issues scoping process, in conjunction with the identification of overall environmental issues. More direct contributions were provided by the Aboriginal Issues, Fort McMurray and Region Infrastructure Subcommittees, and mitigation plan task forces during the actual SEIA preparation stages. Community and Aboriginal stakeholders sat on these subcommittees and the Environmental Subcommittee. A.Env., which chaired the Subcommittee, was informed of progress on SEIA preparation and coordinated the dissemination of this information to Subcommittee members and key provincial government departments which A.Env. represents in the OSLO ART process. The Environmental Subcommittee also received and reviewed the two key socio-economic mitigation plans, the OSLO Industrial Benefits Plan (OIBP), and the OSLO Human Resources Plan (OHRP) in conjunction with its review of the overall EIA process.

The Subcommittee was aware that the draft SEIA for Lease T31 was prepared and that a summary SEIA was provided to the Fort McMurray and Region Infrastructure and the Aboriginal Issues Subcommittees. These documents were not reviewed by the Subcommittee. Two additional biophysical EIA documents, intended to summarize the results of the biophysical EIA process, are not expected to be completed at this time pending the completion of EIA evaluations.

The Subcommittee in carrying out its responsibilities received and considered input on environmental issues from other subcommittees, including the Mining, Extraction, Upgrading, and Utilities and Off-Sites Subcommittees and from the Tailings Management Task Force. Some of the results of socio-economic consultations undertaken by the Fort McMurray and Region Infrastructure and Aboriginal Issues Subcommittees and the mitigation plans produced by the socio-economic task forces were also considered. The key contributions of these groups and the extraordinary efforts of OSLO Project staff to aid the subcommittees' understanding of project plans, and progress achieved in addressing environmental issues, were acknowledged with appreciation by the Subcommittee.

12.2 Environmental Subcommittee Interim Report

In order to assist in the documentation of the progress on project planning achieved to date, the Subcommittee prepared an interim report to OSLO ART. The report summarizes the progress made to date in the EIA and SEIA preparation process and the activities of the Subcommittee. Key elements are noted below:

- legal requirements,
- OSLO EIA objectives,
- EIA preparation — definition of key activities,
- public consultation for the EIA and SEIA,
- preparation of baseline information for the EIA and SEIA,
- project description activities,
- evaluation of socio-economic and biophysical impacts, and
- SEIA and EIA issues and OSLO mitigation plans.

A list of outstanding issues and concerns is included in the Subcommittee's interim report. The list identifies significant issues which one or more Subcommittee members have identified as being of continuing concern. The Subcommittee noted that because time constraints prevented the completion of EIA reports or detailed review by stakeholders, the list may not be comprehensive or it may identify concerns which would have been addressed by the completion of EIA documentation.

The concerns noted in the interim report do attempt to reflect the current stage of completion of OSLO Project planning and the views of Subcommittee stakeholders about the next steps which should be adopted to restart and complete project planning. Outstanding concerns fall within three broad categories: issues which may require further basic research or changes to project planning to produce significant environmental benefits and, as a subgroup, needed additions to EIA documentation; issues which cannot be resolved by OSLO alone; and technical matters which can be addressed in environmental permits and licences. Where concerns cross these arbitrary boundaries, cross-references are provided in the report. The subject matter of these outstanding issues is noted below.

Issues which may require further basic research or significant changes to project planning and further EIA documentation:

- tailings management and tailings reclamation strategy,
- tailings pond location, groundwater seepage mitigation,
- management of VCC bottoms,
- water management plans,
- extraction, upgrading, and environmental technology selection,
- waste reduction, waste treatment, and by-product recovery potential,
- completion of the biophysical EIA and SEIA, and
- regulatory issues which impact on project design.

Issues which cannot be resolved by OSLO alone:

- Cumulative regional SO_2 emissions and associated impacts at the Redwater upgrader site,
- joint initiatives to handle environmental health issues of oil sands development,
- issues relevant to oil sands development,
- ozone concentrations — Fort McMurray and Fort McKay region and Fort Saskatchewan and Redwater region,
- regional studies and consultations on air quality changes and mitigation strategies,
- consultations on the adequacy of models for evaluation of odorous emissions and associated impacts,
- joint initiatives to address emission of contributing greenhouse gases,
- consultation on compensation for red meat losses in conjunction with trapline impacts,
- consultation on monitoring the delivery of employment and business opportunities for affected local communities,
- consultation on reclamation objectives, and
- consultations on protection of traditional Native food sources, community input to biological natural resources management, and protection and enhancement of regional tourism and recreation objectives.

Technical matters which can be addressed in environmental permits and licences:

- headwaters diversion, Development and Reclamation (D&R) Approval,
- sedimentation rates, Kearl Lake,
- reclamation objectives finalization, D&R Approval,
- water management technical requirements,

- deep-well disposal, Redwater upgrader,
- air quality technical requirements, and
- wildlife and wetlands mitigation details, D&R Approval.

The Subcommittee Interim Report notes the following conclusions about the overall EIA process:

- environmental issues raised in the EIA review process have been recognized and have been or are being addressed in socio-economic and biophysical assessments,
- the biophysical assessment process selected by OSLO was effective and flexible. Advantages were noted by OSLO and by other participants in the EIA process,
- OSLO Project planning, although incomplete, produced significant accomplishments from an environmental perspective,
- the Environmental Subcommittee should be reconvened to review the completion of the EIA process, upon initiation of the OSLO application to the ERCB. Expansion of the Subcommittee to include key environmental non-government organizations should be considered. EIA workshops should be continued,
- some recommendations for other projects which propose to use the Adaptive Environmental Assessment and Management Process are noted. Recommendations for future projects with respect to baseline information-gathering procedures, public consultation, and coordination of the biophysical and socio-economic assessments are also noted, and
- identification of appropriate existing or new consultation mechanisms is needed to address issues of regional interest and joint responsibility which were raised in the overall EIA process.

13 OSLO ART CONCLUSIONS

When OSLO ART was initiated, it was expected that all aspects of the OSLO Project, including the application to the ERCB, would be reviewed and that OSLO ART would provide a final report to the ERCB. Following OSLO's decision in April 1991 to suspend the project and not to file an ERCB application, OSLO ART decided to document its work to that point in the form of an "interim" OSLO ART report. This report describes the review process and the status of the issues identified and their resolution. Details of the issues status are contained in the reports of the various subcommittees (Sections 5 to 12) and in the Issues Management Summary (Appendix C). This section provides OSLO ART observations on the review process itself and indicates, in summary fashion, the progress made, agreements reached, areas of concern remaining, and where further work is required.

13.1 Observations on the OSLO ART Process

During the concluding meetings of OSLO ART, participants exchanged views on how the process worked and areas where improvements might be made in future. This section summarizes these comments and details are contained in Appendix E.

OSLO ART achieved its goal of promoting dialogue and better understanding among impacted local communities, the ERCB, Aboriginal people, OSLO, and government departments and as a result, enhanced the review of the OSLO Project. The ART process is recommended for review of large projects which are environmentally sensitive or in which there are a number of diverse stakeholders involved. The process is supportive of both project planning and regulatory review but not replacing the formal regulatory roles of government agencies. The process is effective in identifying key issues and maximizing cooperation of key stakeholders in resolution of issues. It requires the allocation of significant levels of commitment from all of the stakeholders to ensure that work proceeds efficiently. OSLO's commitment and assistance to OSLO ART and its subcommittees, as well as funding assistance for public involvement dealing with Aboriginal, regional socio-economic, and environmental issues, contributed significantly to OSLO ART's success.

The OSLO ART schedule was largely driven by OSLO and the time it needed to complete its various agreements, studies, and consultations. This schedule was generally adequate and the early start desirable to allow public and government stakeholders to bring forward concerns and recommendations for integration in early project planning. While regular monthly meetings were seen as desirable to maintain communication and continuity, it was felt that some of the meetings could be replaced by written updates of OSLO's plans and studies.

In an ART process, early discussion should focus on issue identification, regulatory requirements, and stakeholder objectives. It is important to clarify stakeholder expectations regarding objectives, issues, processes, results, etc. to allow movement towards a meaningful resolution of issues with the recognition that certain participants may have conflicting views. Care should be taken at the outset to ensure this phase of the work is done well. Stakeholder objectives should be expanded to a description of "wants" in those cases where regulatory requirements fall short. The roles and expectations of regulatory agencies should be clarified to address the concerns expressed by some participants of compromising their regulatory authority in the pre-application phase. Such clarification would enable all members to participate fully in discussion of objectives and design criteria of the project and express their positions without compromising their agency or themselves. When issues are raised it should be clarified which stakeholders have responsibility for their resolution or the resolution of different aspects of them.

Experience with the OSLO ART process, particularly at the subcommittee level, indicates the importance of ensuring that there is a sound basis for discussions and that time is not spent on detailed discussions where matters are uncertain or likely to change significantly. This is not to preclude early discussion of issues but is necessary to limit premature detailed discussion.

The appropriate stakeholders from the government and public sectors were involved in the process. Some members saw the value in expanding OSLO ART membership. FEARO believed that representation from other federal government departments such as Fisheries and Oceans and Indian and Northern Affairs would have been advantageous. OSLO suggested that consideration be given to the inclusion of key provincial public interest groups and community leaders particularly in the subcommittees. The ERCB staff believes that expanded membership, although advantageous, could create difficult organizational problems. In fact, the interests and concerns of public interest groups and others not members of OSLO ART were addressed by OSLO through community meetings and workshops.

An essential aspect of an ART process is the participation of senior representatives of the stakeholders. In the case of OSLO ART, the presence of knowledgeable and authoritative representatives was essential to the group's effectiveness. It is important also that all participants in OSLO ART have a broad understanding of the whole project. This can be accomplished by project integration review sessions and greater cross-representation between committees and subcommittees.

It is important that the work of a committee such as OSLO ART be communicated on an ongoing basis to members of the stakeholder organizations and the general public. This provides for current information being made available to all those who share a project interest. The responsibility for keeping their organizations involved lies with the members of OSLO ART and its subcommittees. It has been suggested that the public be informed by periodic newsletters or statements to the press about OSLO ART. Additionally, periodic trips by Aboriginal Issues and Environmental Subcommittees to appropriate regional communities are desirable to provide information and to get an understanding of and focus on important local issues. These activities would be important in gaining community support for the ART process and achieving satisfactory resolution of issues.

To ensure an efficient regulatory review, the formal agreement on the acceptability of the process must be reached between the federal and provincial governments, and the process must jointly satisfy the environmental impact assessment and public consultation requirements of both levels of government.

With the suspension of the OSLO Project, the matter of ongoing public communication was discussed at some length. It was agreed that careful consideration should be given to an appropriately constituted regional communication council to publicly discuss elements of development in the region. Such a council would not be an extension of OSLO ART and should not duplicate or overlap with existing activities. Several OSLO ART members including the ERCB expressed willingness to participate in and assist with the formation of such an ongoing communications program including the provision of start-up funds.

13.2 Issues Identified by OSLO ART Subcommittees

Although the review process was not completed, it is worthy to comment briefly on the progress of the various subcommittees. Readers are referred to earlier sections where details of subcommittee work and findings are to be found.

The subcommittees can be classified as those dealing with technical details of the project design, community or regional matters, and environmental matters. Subcommittees were formed to look at the geology, mining, extraction, upgrading, and utilities and off-site aspects of the project design. Separate committees dealt with Fort McMurray and Region Infrastructure and Aboriginal Issues, while in the Environmental Subcommittee forum socio-economic and biophysical assessments and issues, including those arising from the other subcommittees, were addressed.

Each of the technical committees identified issues and to varying degrees, based on project definition and time available, discussed and resolved the issues identified. The Geology Subcommittee completed its discussions satisfactorily and no outstanding concerns remained. The Mining Subcommittee reached agreement on essentially all issues discussed but noted that certain items require additional clarification and final agreement, including pit wall burial, infrastructure plans, project boundaries, and mining of reserves underlying Kearl Lake. Encouraging developments in the area of dredge mining and hydraulic transportation of oil sands were identified, which have economic and environmental advantages over current mining methods and consequently warrant ongoing attention.

While the bitumen extraction process proposed was put forward by OSLO as the most suitable in terms of energy efficiency, bitumen recovery, and risk and stage of development, there is an ongoing need for those interested in oil sands development to overcome existing process limitations primarily with respect to fine tailings sludge accumulation and toxicity, and improvements in bitumen recovery and energy efficiency. It was agreed that progress was made in terms of understanding OSLO's proposed design basis for tailings management. Novel tailings management schemes under investigation by OSLO were followed with interest to confirm the OSLO expectation that sludge could be reduced for the same size of project, based on experience, by as much as 70 per cent at existing operations. Continued investigation of sludge volume reduction and tailings reclamation techniques to demonstrate their viability is necessary. The location of the tailings ponds in the proximity of aquifers, raised by OSLO towards the end of the process, requires further analysis.

Considerable progress was made in resolving upgrader issues. Matters that require further discussion include upgrader capacity or service factors and alternatives leading to environmental improvement, including upgrader residue management and energy efficiency. These alternatives include power and hydrogen supply studies, potential synergies with adjacent industrial developments, alternative fuels studies, and increased sulphur recovery by OSLO and/or others to reduce regional SO_2 emissions and ensure compliance with ambient environmental regulations.

Although much of the information reviewed in the off-sites and utilities areas was preliminary, key issues were identified and recommendations were discussed with respect to infrastructure plans, water management, and by-product storage and utilization, energy resource sterilization, and environment protection design measures.

The Fort McMurray and Region Infrastructure Subcommittee concluded that while the OSLO Project would have a positive impact on the business community, there was a significant negative impact on the social and recreational infrastructure. It was noted that plans and strategies need to be developed in order to alleviate social and economic impacts. A joint approach of public sector groups in the region was advocated to deal with government on needs.

The AIS discussed issues related to maximizing Aboriginal economic participation in OSLO and the regional economy, including current ongoing Aboriginal participation issues which exist apart from the OSLO Project, and provided input on the OSLO Industrial Benefits and Human Resources plans. An Aboriginal issues workshop, with representatives from eleven Aboriginal groups in the region as well as OSLO ART participants, met to better understand issues and barriers and make recommendations for improvement. The report of this workshop provides recommendations on community development, business opportunities, employment, and education. Continued work is required in all of these areas. Outstanding issues remaining relate to what the Aboriginal communities do when there is no application and what the interim needs are between now and the restart of the OSLO Project. AIS suggested that participants in the OSLO ART process consider assisting in financing the development of an interim regional Aboriginal planning and problem-solving forum.

On suspension of the OSLO Project, Aboriginal people expressed concern because new funds and programs they sought were not forthcoming. They noted that "the key problem facing Aboriginal communities, either with or without the OSLO Project, is to get the necessary programs and services they need to fully and fairly participate in the regional economy". OSLO ART believes that resolution of the Aboriginal peoples' concern is necessary in the interest of resource development.

It should be noted that several concerns were raised by non-technical subcommittees which are not OSLO Project-specific or within the mandate of OSLO ART; and while these may be valid concerns, it is not appropriate to expect their resolution. Such concerns should be addressed to those with responsibility and authority to deal with them.

The Environmental Subcommittee provided a forum for discussion of biophysical and socio-economic issues and would ultimately be the focus for the EIA. It identified a number of issues which may require further basic research or significant changes to project planning and further EIA documentation, particularly tailings management and reclamation strategies; tailings pond location and groundwater migration; water, waste and by-product treatment, disposal, and management in general;

extraction technology selection; and SO_2 emissions and associated impact in the vicinity of the Redwater upgrading site.

14 OSLO ART RECOMMENDATIONS

OSLO ART recommends that:

- The application review team process be applied on OSLO Project re-initiation.
- The establishment of an appropriate constituted regional communication council to provide for ongoing consultation on developments in the Fort McMurray area be given careful consideration. Such a council should not duplicate or overlap with existing activities.
- Several key technical issues identified warrant ongoing research and development by OSLO and others contemplating oil sands developments, to improve environmental acceptability, energy efficiency, and economics. These are principally in the areas of extraction process, tailings management, energy, fuel, and feedstock substitution and by-product utilization measures leading to improved energy efficiency and waste management.

R. Houlihan

Dr. R. N. Houlihan, P.Eng.
Chairman, OSLO Application Review Team
Energy Resources Conservation Board

F. J. Schulte
Alberta Environment

Chief D. MacDonald
Fort McKay Indian Band

E.C.M. (Betty) Collicott

Mayor B. Collicott
Fort McMurray

Mr. M. Mercredi
Athabasca Native Development Corporation

Mr. P. Scott
Federal Environmental
Assessment Review Office

Mr. G. Armitage
District Superintendent
Alberta Forestry, Lands and Wildlife

Mr. G. Boddez
Municipal Administrator
Municipal District of Sturgeon No. 90

Mr. G. Stringham
Alberta Energy

D. B. Allen

Mr. D. B. Allen
Technical Services Manager, OSLO

APPENDIX A

OSLO ART TERMS OF REFERENCE

OSLO APPLICATION REVIEW TEAM (OSLO ART)

Terms of Reference

1. An "Other Six Leases Operation" Application Review Team (OSLO ART) is established to consist of representatives from OSLO, Alberta Environment (A.Env.), Alberta Energy (A.E.), City of Fort McMurray, Municipal District of Sturgeon No. 90, Fort McKay Community, Athabasca Native Development Corporation (ANDC), Alberta Forestry, Lands and Wildlife (FL&W), the Government of Canada as represented by the Federal Environmental Assessment Review Office (FEARO), and the Energy Resources Conservation Board (ERCB). The ERCB will chair the review team, and will record and disseminate its conclusions.

2. The purpose of the OSLO ART is to deal with OSLO's proposal to construct the OSLO Project consisting of oil sands mining and crude bitumen production facilities at Lease T31 near Kearl Lake and an upgrader near Redwater, which will achieve production capacity of approximately 12 700 m^3 per calendar day of synthetic crude oil (SCO), by:

    a. consulting with OSLO prior to the filing of the applications* to identify significant issues of mutual interest and advise of problems, concerns, or interests which might be dealt with in the applications,

    b. promptly reviewing the applications when they are filed to identify the need for further clarification, information, and understanding, and to give consideration to all aspects of the proposal including:

        (i) energy resource conservation and economic, orderly, and efficient development of the resource,

        (ii) on-site environment protection, pollution control, and the observance of safe practices,

        (iii) regional and local environmental impacts (air, water, land use), and

        (iv) socio-economic impacts and the fulfilment of the public interest, including employment and business opportunities for local Native and non-Native residents,

    c. employing a consultative, problem-solving approach to resolve problems and issues,

    d. employing subgroups to deal with specific concerns that may arise,

    e. documenting any agreements reached, supplementary information filed, concerns raised, or assurances given,

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* Includes ERCB and A.Env. applications.

f. documenting any areas of concern in which agreement has not been reached,

g. preparing a final report summarizing the matters addressed and the views of the Review Team members with regard to:

   (i) whether concerns respecting items b (i), (ii), (iii), and (iv) have been properly addressed; and

   (ii) whether the ERCB application and the Environmental Impact Assessment (EIA) are suitable for consideration by the ERCB at a public hearing; and

   (iii) documenting conclusions reached and proposing conditions for the consideration of the ERCB, A.E., FL&W, and other affected agencies should the project be approved.

3. The objectives of the OSLO ART are to maximize the cooperation and communication between the parties, maximize each party's satisfaction with the decision and outcome, and minimize the time and cost associated with the review and approval procedure.

4. The scope of OSLO ART is to facilitate assessment and consultation on issues arising from the OSLO Project application. The ERCB and A.Env. will consider the conclusions of OSLO ART as key parts of the information leading to decisions on disposition of the applications.

5. Regardless of the outcome of the discussions of the review team, the final decisions on the applications would have to be in conformance with the established legislation.

6. The application review process being discussed would also tie into the A.Env. EIA process and the permit and licence processes under the Clean Air Act, the Clean Water Act, the Water Resources Act, and the Land Surface Conservation and Reclamation Act, and with the Federal Environmental Assessment Review Process (EARP). Overall control and final decision with regard to the EIA would continue to reside with the Minister of the Environment and permit and licence matters with the appropriate department officials. The OSLO ART final report would attempt to be fully compatible with licence matters and thereby assist in the simultaneous consideration of such matters by A.Env. It is also agreed that it is important to maintain flexibility rather than adopt rigid guidelines in this regard.

7. The review team will consider broad economic and social aspects including those related to Native aspirations and lifestyle.

8. If there is a lack of agreement on any items, each party is free to play its normal role with respect to outstanding issues.

9. There are no restrictions on those items which might be discussed by the team, but only directly relevant items will be documented whereas other items might be subject to informal and undocumented agreements or formalized agreements outside of this review process.

10. The initial basis for discussion for the OSLO ART is a "Draft Preliminary Outline" of the project, provided by OSLO in February 1989. The subsequent basis for consideration will be the applications, to be filed by OSLO in early 1991.

11. The ERCB will fund reasonable participation by:

    a. the Fort McKay Community by paying for:

        - its lawyer, and associated reasonable expenses,
        - its environmental advisor, and associated reasonable expenses, and
        - the reasonable expenses of the Chief of the Fort McKay Indian Band or a designated representative; and

    b. the ANDC by paying for the reasonable expenses of the President and Executive Director of the ANDC or a designated representative.

    The ERCB will bill OSLO for recovery of the monies expended.

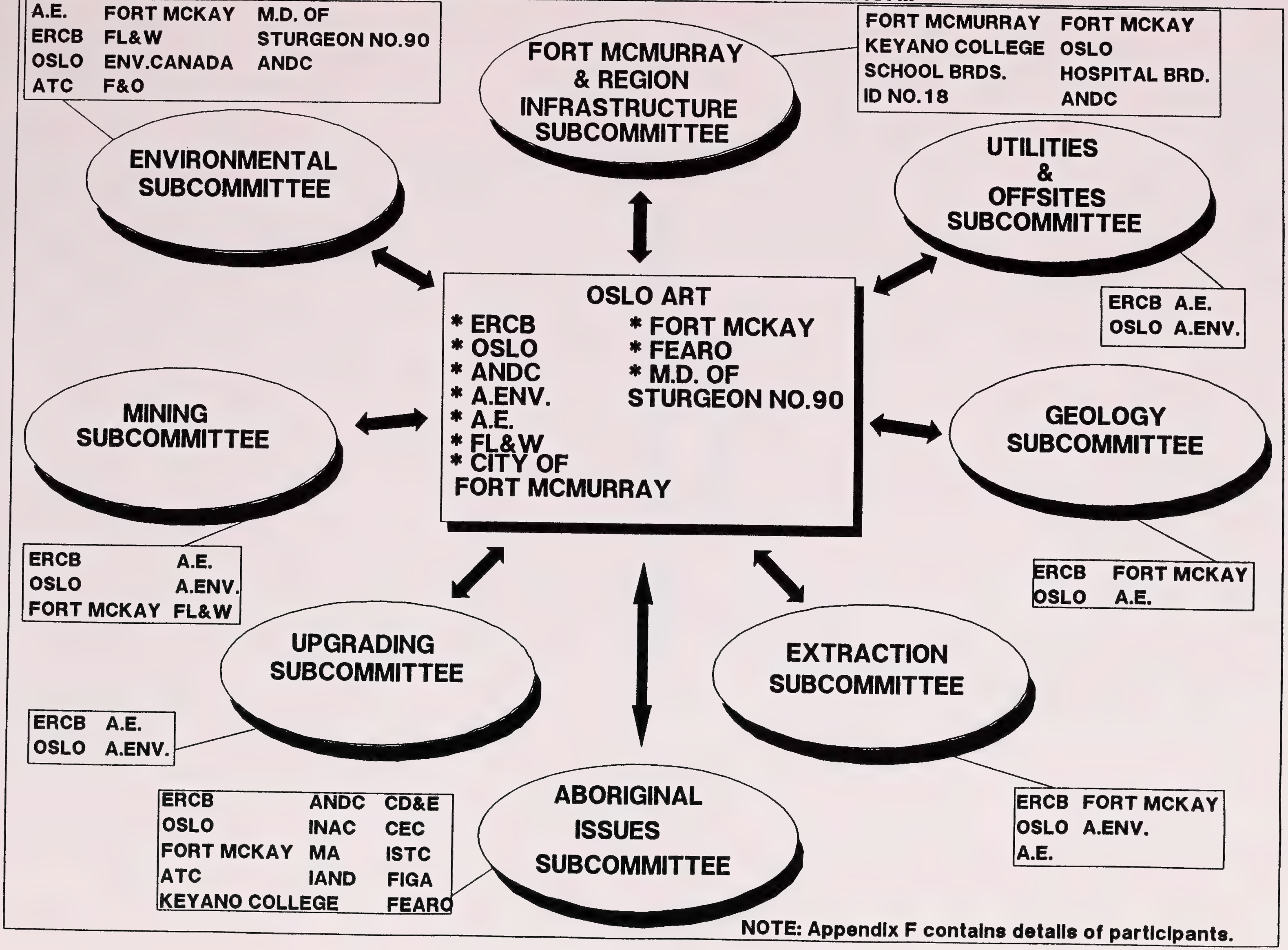
12. The OSLO ART may deem it advisable to hire consultants to advise it on technical aspects of the plant operations or equipment. If so, it will apply to the appropriate levels of the sponsoring agencies for agreement to fund the consultant study, and will not proceed to hire a consultant until proper authorization is received.

13. With respect to public release of information or communication with the "media", each of the Review Team members intends to be as cooperative as possible with other participants regarding public releases or statements, and would seek their input to the maximum extent possible. However, they cannot agree to any overriding constraints which would prevent them from carrying out their responsibilities or legal or moral obligations to respond to requests for information. Additionally, the procedures utilized for processing of the application must follow the rules relating to applications being considered by the ERCB.

APPENDIX B

OSLO ART SUBCOMMITTEES

OSLO ART SUBCOMMITTEES' MEMBERSHIP



NOTE: Appendix F contains details of participants.

APPENDIX C

ISSUES MANAGEMENT SUMMARY

July 1, 1991

1.1.0.0

GEOLOGY

Geological Description

SITE

Bitumen Production

The geological description required in the application needs to include isopachs of muskeg, overburden and plantfeed thickness, waste to ore ratios, plantfeed grade, plantfeed types, clay and reject lenses.

RECORD

OSLO has been conducting drilling programs for several years in order to gather the technical data that will allow us to complete the required geological descriptions. Nov.8, 1989 met with ERCB to discuss methods used in interpretation of the geological data.
Note: Plantfeed thickness , Waste to Ore Ratio, Plantfeed Grade and Plantfeed types are covered under Mining Section after Mining Issues are resolved.
Geology met on Nov. 8 and Dec. 18/89 with ERCB through the OSLO ART sub-committee. Overburden geology, the geology of specific sites, basal aquifer hydrology, fines analysis, and the information, guides and selectivity on maps and sections were discussed.
All items discussed in ART meeting - no outstanding concerns.
Winter program for drilling and geophysical surveying were conducted in 1989-90. Meetings with the OSLO ART Geology Sub-committee were held to discuss geophysical techniques, dipmeter interpretation, geological cutoff, depositional trends and other technical issues.

ACTION

OSLO has recleved a draft OSLO ART Geology Subcommittee report. Comments have been returned for inclusion in the final copy. No apparent outstanding concerns.

1.2.0.0

GEOLOGY

Geotechnical

Bitumen Production

Require a detailed explanation of geotechnical considerations for selection of slopes for pit wall as well as the discard disposal pile, soil types, design strength parameters, gas exsolution, and dewatering or depressurization issues as well as remedial measures to be taken and monitoring techniques to be utilized.

RECORD

Engineering draft reports addressing all of these issues except depressurization of the basal aquifier have been prepared. A February OSLO ART Mining subcommittee meeting was held to review all geotechnical and depressurization considerations. No major issues arose.
Work and discussions on the outstanding issues have proceeded since the last OSLO ART subcommittee meeting on May 24, 1990.
Future ART subcommittees will include more details on the geotechnical impacts of waste dump siting and buried channel hydrology.
OSLO has recleved a draft OSLO ART Geology Subcommittee report. Comments have been returned for inclusion in the final copy.

ACTION

Presentations on the basal aquifer and waste dump siting were part of the November 26, 1990 OSLO ART Subcommittee meeting. Most outstanding concerns havew been addressed.

1.3.0.0

GEOLOGY

Overburden Analysis

SITE

Bitumen Production

Determine the reclamation suitability of the overburden for use in the OSLO site reclamation.

RECORD

Work on-going with 3-D modelling.
Report completed Jan. 1990. Reclamation suitability has been documented by overburden unit. Some reclamation data on texture will be collected in 1990 drilling program however OSLO has sufficient knowledge of materials to develop conceptual reclamation plan.
Suite of 83 overburden Shelby tube samples collected in 1989 submitted for analysis to determine suitability for reclamation use. Work is ongoing to integrate the results into a newly constructed comprehensive overburden data base. Details of reclamation plan continue to be refined. **A comprehensive overburden data base is complete.**
Integrate results of report into conceptual reclamation plan.
Work on reclamation developed as follow-up to May, 1990 ART meeting, presented as part of November 26, 1990 OSLO ART subcommittee meeting.
Estimates of suitability of available material, and deployment plans discussed.

ACTION

No further work currently planned until incorporation into reclamation planning.

2.1.0.0

SITE SELECTION

Areas Involved

Bitumen Production

A detailed explanation of the reasons for choosing the proposed plant site location. Emphasis should be placed on the volume of mineable ore that will be sterilized, plans to recover this ore in the future, and plans to accommodate plant site requirements should future expansions take place. Arrangements to accomodate siting must be well documented in the application.

RECORD

Studies conducted to date have been based on the geological and geotechnical data collected during the winter programs since 1983.
A preliminary site selection screening study was conducted in 1986, which identified a number of alternatives for consideration, including geotechnical foundation considerations of importance in site selection.
An Environmental Impact Study has been completed in 1989 for the proposed Tailings Dump and Plant Site locations.
Met Dec. 6th, 1989 with OSLO ART sub-committee to discuss the lease development plan and to outline OSLO's basic philosophies for overall conceptual lease development. Reviewed EIA aspects of siting as well as economic considerations. Plans for expansion (ie. above the stated capacity of 12,000cubic meters per day) are not being considered at this time. January 17th and February 16th OSLO ART Mining Subcommittee meetings have been held to further discuss the plant siting impacts. Feb. 21 meeting with ERCB resulted in agreement on geology in plant site area. Minimum mining thickness and cutoff grade for evaluating reserves outside the 35 yr pit area endorsed at 3 metres and 6.5% . The recommended tailings disposal area has been supported by all subcommittee members at the January, 1990 meeting. The ART Mining subcommittee endorsed the recommended plant site on May 1990 conditional upon there not being any major scope change in the project. Subsequent to the decision to adopt an off-lease upgrader, the plant siting was again reviewed with the ERCB (July 19, 1990). Presently the location of the major plant facilities(ie. extraction plant and utilities) is considered appropriate by the ERCB. They have requested that additional effort be made to locate support facilities (shops, offices, etc.) away from areas underlain by potentially mineable resources.

ACTION

Further discussions around the details of the plant site layout will take place in the Utilities and Offsites ART Subcommittee.

2.1.1.0

SITE SELECTION Location Choice

SITE

Upgrader

Location choice will need to be examined and needs to be clearly explained.

RECORD

OSLO initiated a multi-functional site-selection team, consisting of key internal technical representatives, OSLO senior environmental staff, consultants from geo-technical, legal, and environmental fields.
Reviewed approval with OSLO ART at September 1990 meeting.

ACTION

Initiate reviews with communities in selected area. Address the OSLO approach through the Utilities S/C.
UpgraderTeam supported Project review meetings/openhouses, sponsored and coordinated by Regulatory Affairs in 1Q'91 with selected communities in the Redwater area. Meetings went well and that there were no new issues as a result of the openhouses.

3.1.0.0

MINING Methods Selection

Bitumen Production

The ERCB application must include a detailed explanation of the proposed mining method, including equipment selection, alternatives considered, and highwall slope angles to be utilized.

RECORD

A meeting was held with the ERCB on Dec. 6th, 1989 to discuss the modelling done to date. The geologic and mine models being used were reviewed. After the Ore Criteria were agreed to, several iterations of Mining Systems were run so as to assess the benefits of the best system. Geologic model and ore criteria (cutoff grade, minimum mining thickness) was reviewed with OSLO ART sub-committee in December 1989. Detailed computer modelling was carried out to identify the most effective mining system for OSLO. Met with OSLO ART sub-committee on Jan. 17, 1990 to review methodology to be utilized in the screening of the mining method selection. OSLO's recommendation to utilize a truck/shovel mining method was reviewed with the ART Mining subcommittee in May, 1990. No objections were raised.

ACTION

Although the mine and waste management plans were accepted, and several options were discussed for placing waste along final pit walls, it is recognized that detailed waste disposal plans will be discussed with the ERCB on an ongoing, yearly basis.

3.2.1.0

MINING Mine Parameters
Future Expansion

Bitumen Production

A discussion on the plans beyond the current mine plan, including resource quality, life expectancy of expansions, and future reclamation plans is necessary to balance the current application.

RECORD

A preliminary plan, entitled the Lease Development Plan has been initiated that will outline conceptual plans for mining beyond the current application time frame. It will summarize the assumptions and the philosophies used in preparing the L.D.P.
This plan was reviewed with the OSLO ART Sub-committee on Dec.6, 1989. On Jan. 17, 1990 a number of questions and concerns generated by the ERCB were answered. There are now no major issues outstanding.

ACTION

No outstanding issues.

3.2.2.0
MINING
Mine Parameters
Resource Recovery
SITE
Bitumen Production

The Application must include a detailed evaluation of the overall resource recovery efficiency for the project.

RECORD

This is not a unique and specific issue and will be dealt with as part of Ore Criteria and Mine Method Selection. Cutoff grade, minimum mining thickness plus modelling parameters were reviewed with OSLO ART on December 6/89. The cutoff grades were accepted on Jan. 17 and the minimum mining thickness on Feb. 16. There are no issues outstanding on the modelling techniques. Cutoff grade and minimum mining thickness have been agreed to for mine start-up, and will be reviewed with the ERCB on an ongoing basis during operation.

Further discussions on resource recovery will be done in the context of ongoing dialogue with OSLO ART.

ACTION

No further action required.

3.2.3.0
MINING
Mine Parameters
Cut-off Grade and Ore Criteria
Bitumen Production

ERCB application will require a detailed explanaion of how the cutoffs were arrived at. Included in this explanation should be reference to economic considerations.

RECORD

Analysis of varying cut-off grades and minimum mining thickness is complete. Optimization of these and other Ore Criteria will continue. Cutoff grades and minimum mining thickness parameters were recommended at the Dec. 6/89 OSLO ART. After responding to a list of questions and concerns generated by the ERCB, the recommended cutoff grades were supported by all committee reps. at the January 17th meeting. An additional workshop was held on January 24 to address ERCB concerns over the minimum mining thickness (MMT). The MMT was subsequently supported at the Feb. 16 subcommittee meeting. Cutoff grade (7.5wt% in upper peritidal and 6.5wt% in fluvial estuarine) and minimum mining thickness (5.0m.) have been agreed to by the mining sub-committee members. The method for establishing the base of feed limits was reviewed at the May 24th Mining subcommittee meeting of OSLO ART--no objections were raised.

ACTION

No outstanding issues relating to this item.

July 1, 1991

3.2.4.0
MINING

Mine Paramenters
Discard Requirement

SITE

Bitumen Production

This will require a detailed explanation of inpit and out of pit discard site requirements, including size, location and timing, as well as the volume and quality of ore impacted.

RECORD

Continuing current study with respect to this issue. This is tied inherently to Siting Selection and overall Waste/Tailings Management. Met with the ART Mining Subcommittee Jan. 17, 1990 to review current status and review development strategy and waste management integration with mine planning. Tailings pond location agreed to subject to satisfactory surface lessee arrangements.

ACTION

At the November 26, 1990 ART Mining Subcommittee meeting, OSLO's waste management plan and waste dump siting requirements and selections were reviewed. The plans were then further reviewed with the ERCB and the Department of Forestry, Lands and Wildlife on Jan. 16, 1991. A few additional issues were discussed and are now incorporated into the designs.

4.1.0.0
EXTRACTION

Process Selection

Bitumen Production

The ERCB requires that the Process Selection: (1) meets the Board's - **ERCB circulated targeting 95% recovery OSLO pilots and average substantial ore grade this level of recovery** - bitumen recovery objective; (2) **Fresh H2O makeup is <2% of extraction process requirements - balance of needs achieved through tailings H2O recycle, basal aquifer runoff, and treated effluent** requires minimum fresh water make-up; and (3) movement toward solutions of tailings management problems (sludge, tailings ponds). **Tailings issues being addressed through "tailings task force".**

RECORD

Froth Preparation Pilot plant in Calgary started up in Sept. 1989. Extraction piloting on vessel configuration and chemical additives to continue into 1990. Preliminary testing of OSLO Hot Water Extraction (OHWE) process conducted at Syncrude Research facility in Edmonton. Calgary pilot facility was converted to OHWE process, and testing proceeded through February 1990. Wet Hybrid is now preferred base-case for DBM preparation. Extraction Subcommittee of ART met in Jan. March, April, June, and **December**1990 to review past work and process selection criteria. ART committee was given an overview of Processes considered and selected in Edmonton meeting of June 28, 1990.
Froth Treatment pilot work started in December 1989, seeking improvements over existing processes.
Process selection criteria was reviewed with the OSLO ART extraction sub-committee in April and June, 1990.
Pilot test results and proposed extraction processes have been reviewed with OSLO A.R.T. subcommittee on an ongoing basis. **Number of subcommittee and direct meetings with ERCB to review technology selection. Draft of ERCB application prepared, technology comparisons tabulated.**

ACTION

ART subcommittee has requested (1) **expressed quantative comparison of alternative extraction technologies assessed and also include sludge make and management alternatives (2) confirmation of bitumen recoveries expected with technology proposed over the life of the project (3)** alternative processes be compared in tabular form for furthur discussion.

4.2.0.0
EXTRACTION
Bitumen Recovery From Tailings
SITE
Bitumen Production

The application must access the feasibility of bitumen recovery from the, tailings and free sludge, (if any) in the tailings disposal area.

RECORD

A multi-functional team has been set up in OSLO to investigate environmental safety and ensure waste is managed in a responsible manner. Environmental design guidelines have been prepared and are distributed within the project to encourage awareness of environmental safety. Bitumen recovered from the pond has no negative effect on the Upgrading Process, and will be processed through HTFT and blended as part of the upgrader supply.

ACTION

Comprehensive waste management study yet to be undertaken.

4.3.0.0
EXTRACTION
Process Water
Make-up Water Source
Bitumen Production

Withdrawal of water from the Athabasca River is a sensitive issue and will not be considered by Alberta Environment without some very strong reasoning for its use.

RECORD

Process efficiencies are being optimized to ensure minimum make-up water will be needed. Evaluation of potential sources has been completed. Primary source of make-up water will be treated Basal Aquifer water. Mine surface runoff and 'de-oiled' oily water sewer stream fed to the process water pond together with tailings recycle water. There will be very little requirement for raw water makeup to the process water pond as there is projected to be an excess of treated basal aquifier (if suitable quality for extraction process) water which minimizes raw water use. Water Management Strategy has been reviewed with OSLO ART.
Water management strategy was updated in December, 1990 to reflect the latest balances and strategy.

ACTION

No furthur actions.

4.4.0.0

EXTRACTION Tailings Pond Requirements

SITE

Bitumen Production

The ERCB Application must include a detailed explanation of the tailings pond requirements. Part of the detail supporting a tailings pond proposal will need to be the specifications OSLO has built into the design of such a pond. What is the OSLO plan for research with respect to the long-term tailings management requirements on Lease 31?

RECORD

Studies have been ongoing regarding size, location, construction method, height of dykes,and geotechnical considerations with respect to dyke design. Construction and stability monitoring programs are being developed. Jan. 1990 meeting with ART addressed the basic design philosophy behind the work done to date. Detailed design criteria will be available once specific sites are selected and foundation conditions have been evaluated and all the geotechnical work is concluded and incorporated in the proposed design. Base case tailings management research requirements are being investigated. Special ART committee meeting was held on June 29,1990 at which time an overview was given concerning the current strategy, as well as previous studies and current/future development work. Follow up meeting proposed for Sept. or October 1990.

Discussion has been tied to the extraction process that has been selected (Wet Hybrid) and the overall waste management and reclamation plans.

Studies planned to determine the geotechnical properties of Wet Hybrid tailings and to assist in-pit disposal concepts with emphasis on development of a biologically productive lake. Tailings construction methods will be evaluated prior to and following appropriation by pilot programs after identification of tailings stream product parameters from current pilot work. Reviewing current pilot work and base-case situation. Prepare long term research strategy.

ACTION

5.2.1.1

WATER MANAGEMENT Process water Makeup Requirements

Bitumen Production

Quantity and quality of make-up water will need to be forcasted

RECORD

Water requirements as calculated on a 35 year average are projected to be 27 million cubic meters per year in the hybrid or OHWE scenario. If the conventional tailings method is used the projected requirement is 29 million cubic meters. The prime source of make-up water is from the Basal Aquifer. Additional make-up, as required will be drawn from the Athabasca river. Final volumes will be reflected in the DBM. There is a potential to trend the final requirements downward.

General discussion of project water balance studies held with A.R.T. sub-committee in December, 1989, and May, 1990.

Water management strategy and related balances was updated in **December**, 1990. Based on the revised balances, a decision was made to delay the installation of the effluent pipeline.

ACTION

Simulate process water characterization over time to determine if water quality has impact on the Froth Preparation process. Initial results will be available September, 1991.

6.1.0.0 UPGRADING — Process Selection

SITE: Upgrader Location

The OSLO project is committed to utilizing best available, commercially applicable technology in the design of the upgrading facilities. The project has been requested to provide a detailed anlysis of the process(es) selected. Special reference to alternatives considered and any new technology being utilized (including costs and benefits) will be required.

RECORD

Analysis of upgrading technology has been ongoing since 1986. The VEBA Combi-Cracking hydrogen addition technology has been selected for the primary conversion unit(PCU), based on its efficiency **processing** OSLO bitumen; both energy and environmental efficiency. Process selection criteria and results have been reviewed with EMR,ART, and certain competing technology proponents. VEBA Licensor agreements signed October 31, 1989. Sulphur recovery process selected (MCRC) and reviewed with ART Upgrading sub-committee Nov. 1989. **PCU process selection was reviewed with ART upgrading sub-committee November, 1989. Sour water stripper technology selection and amine selection was reviewed with ART Upgrading Subcommittee on March 16, 1990 and November 13, 1990, respectively.**
The hydroconversion residue or bottoms studies were reviewed at the November 29, 1990 ART Upgrading Subcommittee meeting.

ACTION

A review of the final process design of the upgrading process facilities is scheduled for May 9, 1991.

6.1.1.0 UPGRADING — Sulphur Recovery

Upgrader Location

RECORD

Sulpur recovery process selected and reviewed with OSLO ART Upgrading sub-committee Nov. 1989.

ACTION

6.1.1.1 UPGRADING — Sulphur Recovery Sparing Philosophy

Upgrader Location

OSLO needs to explain plans and philosophy for sparing.

RECORD

OSLO originally proposed 3 x 50% units at the time the upgrading and sulphur recovery technology selection was made. At the April 1990 Upgrading subcommittee meeting, OSLO advised that the design basis was now 2 x 60% units. Some economic explanation was provided to the subcommittee. **Additional information has been provided on mitigation plans to reduce emissions during upsets.**

ACTION

The final discussions on sparing were completed at the December 12, 1990 ART Upgrading Subcommittee meeting and with subsequent communications with subcommittee members. Any outstanding questions are expected to be resolved at the May 9 meeting.

6.2.0.0

UPGRADING | High quality Synthetic Crude Oil | SITE Upgrader Location

OSLO will need to provide analysis of the high quality synthetic crude oil product.

RECORD

Target specifications for SCO are available and have been presented to the ART briefing session held in May'89, and to ART upgrading subcommittee in Nov.89. Product quality targets ratified by OSLO owners. VEBA Large Pilot Plant test run sucessfully completed. **Small pilot plant tests to produce SCO samples for analysis completed.**

ACTION

SCO analytical results have been delayed to late May. Preliminary information is planned for review at the May 9, 1991 final meeting.

6.3.0.0

UPGRADING | PCU Residue Composition and Management | Upgrader Location

Provide detailed information on the composition and volume of the PCU residue and a discussion of the alternatives and selected process(es) for management(ie. utilization) of this material.

RECORD

Preliminary and typical composition information was presented at the May ART briefing. Current basis is stockpiling of bottoms for future exploitation/utilization. Combustion and pyrolysis options were found to be economically and environmentally unattractive. **Activities to scope the technical viability of market outlets to begin in Sept.'90.** Review of alternatives with ART **on November 29, 1990**

ACTION

7.1.0.0

UTILITIES | Energy Efficiency | Common

The ERCB is mandated to ensure that fossil fuel energy efficiency is optimized. The OSLO project will be required to provide: an overall energy balance; an explanation of all design and operational features incorporated to minimize energy losses; and a description of energy efficiency monitoring methods that will be utilized.

RECORD

PBM level of detail available now. Preliminary information presented at May, 1989 briefing. Current information is subject to optimization throughout definitive planning and detailed design phases. **Project Task Force created to study issues related to greenhouse gases, including energy efficiency.** Review and update optimization with ART Utilities subcommittee in **December,** 1990.

ACTION

Project Task Force created to study issues related to greenhouse gases, including energy efficiency.

7.2.0.0
UTILITIES
Alternative Fuels
SITE
Common

The OSLO project has been requested to provide a discussion of alternative fuels considered and chosen for the make-up fuel for the processing and utility plants. This will include complete fuel balances for each alternative.

RECORD

Alternative fuel study completed in March, 1990. Natural gas confirmed as most environmentally and economically attractive fuel. Reviewed study and decision criteria with ART **Upgrading** / Utilities Sub-committee **November, 1990.**

ACTION

No outstanding issues

8.1.1.0
SITE
INFRASTRUCTURE
Site Access
Highway 63
Bitumen Production

Identify means to provide reasonable commuting for OSLO employees/contractors during construction and operations phases. Identify and resolve local transportation issues within City of Ft. McMurray.

RECORD

Meeting with Alta. Transportation on Sept.22'89 and follow up meeting Oct.4'89 with Alta. Transportation and City of Ft. McMurray to discuss highway 63 and east side road options re: UMA preliminary study. Ft. McMurray has expressed concern about existing local transportation which needs to be addressed. Alta Transportation developed cost/benefit model for east side route vs upgrade of highway 63.

Alta. Transportation started upgrade of Hwy 63 south of Ft. McMurray. City to scope out issues and address to appropriate stakeholders. The Hwy 63 and east side options were run on Alta. Trans. cost/benefit mosdel in Sept/90 against new numbers for lease 31 staffing.

ACTION

8.1.2.0
SITE
INFRASTRUCTURE
Site Access
Canterra Access
Bitumen Production

RECORD

Existing Husky/Canterra road used for access to OSLO site. Road Use Agreement in place.

Ongoing discussion to integrate Husky/Canterra access needs into project plans. April 6, 1990 meeting with Husky did not identify any new issues or items of concern. Formalized agreement will be pursued at a later date. **Meeting in July 1990 with Husky to discuss traffic safety, ongoing maintenance.**

ACTION

No further action required.

8.2.1.0

OFFSITES | Power Plant and Utility Corridor | SITE: Bitumen Production

The location of the power/utility corridor and the ownership of the Utility plant.

RECORD

The current status is that an 8 mega-watt line is planned for construction in 1992. This line would be an upgrade of the existing 25KV line to the Husky Pilot. Alberta Power require 1 year lead time to supply. 240KV line proposed to follow the products pipeline. Studies are ongoing regarding the amount of power that will be required and the capacity and voltage level of line necessary to supply it. Working on the issue of plant ownership at this time.

ACTION

There will not be a committment to Alberta Power on the line construction until appropriation approval. Discussions with Alberta Power are continuing.

8.2.2.0

OFFSITES | Gas Supply | Bitumen Production

Where will the pipeline be located and plans to recover any economic ore underlying the right-of-way.

RECORD

A formal proposal will be requested from potential suppliers. Terms will be negotiated with compete selection anticipated by year end 1990. Pipeline corridors will be located to minimize oil sand sterilization.

ACTION

Offsites plans will be available in the fourth quarter of 1990

8.3.0.0

OFFSITES | Water Intake, Pipeline | Bitumen Production

Water intake site at the Athabasca River

RECORD

Location is at the barge landing site. Pipeline route to follow the existing corridor and proposed access road. Consent required from Department of Transportation to place pumphouse on their site, concept has been approved.

ACTION

Facility details required for final approval during EDS stage.

8.3.1.0

OFFSITES | Water Intake, Pipeline | Upgrader

Water intake site on the N.Sask. River

RECORD

Sites now being considered and synergies with industry being explored. Review options with ART Utilities subcommittee January, 1991. Surface Lease signed with Esso Chemical.

ACTION

No further action.

July 1, 1991

9.1.0.0

ENVIRONMENT

Environmental Impact Assessment (EIA) Process

SITE

Common

An EIA process that meets the requirements of Alberta Environment, the **Federal Environmental Assessment and Review Process**, and appropriately accommodates input by other key stakeholders is required.

RECORD

An EIA process based on issues scoping was developed by OSLO and endorsed by Alberta Environment and the OSLO ART Environmental Sub-committee in May, 1989. The process involves development of consensus among key stakeholders regarding the key environmental components, the extent and seriousness of predicted impacts and the requirementas for mitigation, management and monitoring . Consensus is reached via mult-stakeholder EIA workshops and results are reviewed by OSLO ART and with the interested public at large via open house meetings and with special interest groups through special briefings.

Impact predications in the form of hypotheses have been developed for OSLO Lease 31 and the U/G site facilities at EIA workshops held in October, 1989, March, September, October and December1990. A final wrap-up EIA workshop was held in June 1991. A list of issues and concerns requiring priority attention was compiled, and is listed in the OSLO ART Environmental Subcommittee Interim Report dated June, 1991.

ACTION

- Upon project restart, the draft EIA will be completed and, following further consultation with stakeholders, will be submitted as a protion of the ERCB Application.

9.2.1.0

ENVIRONMENT

EIA Baseline Studies - Lease 31

Bitumen Production

There is a need to compile an appropriate environmental baseline data base for the OSLO Lease 31 project area.

RECORD

Multi-disciplinary baseline field studies for Lease 31 were completed in October, 1989. A listing of study reports is available from OSLO. Copies of each report were provided to the Alberta Environment, Edmonton library; The Alberta Environmental Network office in Edmonton; and the Fort McMurray Environmental Association in July, 1990. Copies of additional baseline reportswere made available to AE, AEN and FMEA as they became available. A summary report was made available in May 1991.

ACTION

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9.2.2.0
ENVIRONMENT
EIA Baseline Studies - Upgrader Site
SITE
Upgrader

There is a need to compile an appropriate environmental baseline data base for the OSLO Upgrader site.

RECORD

- EIA studies were undertaken for this site in the early 1980's in support of several proposed petrochemical plants. Other data are available for the area from government and industry and are believed to be adequate to support the OSLO EIA.

A listing of environmental information sources and government consultations undertaken in regard to the Redwater site was provided to the chairman of the A.R.T. environmental subcommittee in January, 1991.

ACTION

- Summarization of available environmental data for the upgrader site is in progress and will be available for distribution to stakeholders in May, 1991.

9.2.2.0
ENVIRONMENT
Upgrader Site Selection
Upgrader

OSLO must demonstrate how environmental and technical considerations were evaluated in selection of the site for the upgrader.

RECORD

A multi-disciplinary team selected the most appropriate site using a K-T analysis of environmental and engineering criteria. Environmental and engineering teams met separately and scored the alternatives and both teams independently selected the Redwater site. A report summarizing the site selection process is available from OSLO. **The report was reviewed at the October 19, 1990 EIA workshop in Redwater and at the December 11, 1990 SEIA workshop, also held in Redwater. The process utilized and the outcome is well accepted by the key stakeholder groups.**

ACTION

No further actions planned.

9.3.1.0
ENVIRONMENT
ENGO Involvement in EIA
Common

ENGO's will be taking a close interest in the project EIA. Direct involvement in OSLO ART will not be possible so alternative approaches are required.

RECORD

- Periodic briefings have been held with the Ft. Mcurray Environmental Association in 1989 and 1990. A detailed briefing was held with interested member organization of the Alberta Environmental Network in Edmonton on April 30, 1990. Copies of baseline reports were provided to the FMEA and the AEN in July, 1990 **and additional reports were forwarded in October, 1990.**

Arrangements have been made with the AEN to support representatives of their Energy / Clean Air caucus participation in the EIA workshop.

An initial response to some outstanding concerns was forwarded to the AEN in January, 1991.

ACTION

Liaison with ENGO's will continue throughout the EIA preparation process and concerns identified by these groups will be addressed.

9.4.1.0

ENVIRONMENT

EIA Hypotheses - Lease 31

SITE

Bitumen Production

Hypotheses statements summarizing stakeholder consensus on potential project-related impacts on valued environmental components (VEC's) in the OSLO Lease 31 area have been prepared.
(Note: Additional details on the hypotheses are available on request to OSLO).

RECORD

The following statements summarize consensus on the validity of the impact hypotheses and the scope, magnitude and seriousness of the predicted impacts.

ACTION

The following statements summarize impact mitigation and mangement actions that will be taken by OSLO (and where applicable, by others) to limit impacts to acceptable levels and to verify the effectiveness of those actions during project operation.

9.4.1.1

AIR QUALITY

Bitumen Production

A-1

Air emissions from OSLO and/or from other operations will result in short-term increases in concentrations of SO2, NOx and CO.

RECORD

- Validated hypotheses **were** subject to development of impact mitigation and management plans at the **December 13, 1990** EIA Workshop #V.
- **All hypotheses have been validated for the various VEC's and documentation is being completed.**
- **Valid for NOx, CO; may be short-term increase in background concentrations but less than ambient air quality standards.**
- **Invalid for SO2**
- **OSLO contribution not significant for SO2**
- **NOx and CO contributions measurable but no excedences of ambient standards predicted.**

ACTION

- **Utilize low NOx burners.**
- **May need to combine stacks**

9.4.1.1

ENVIRONMENT
EIA Hypotheses -

SITE
Bitumen Production

A-2
Air emissions from OSLO and/or from other operations will result in long-term increases in concentrations of SO2, NOx, and CO.

RECORD
- **As above for A-1**

ACTION
- **As above for A-1**

9.4.1.1

AIR QUALITY

Bitumen Production

A-3
Acid-forming emissions from OSLO and/or other operations will result in acid rain.

RECORD
- **Not valid for OSLO contribution to North-east Alberta airshed.**

ACTION
- **Utilize low NOx burners.**
- **No further mitigation required**

9.4.1.1

AIR QUALITY

Bitumen Production

A-4
Emissions of H2S and hydrocarbons will result in off-site odours.

RECORD
- **Onsite, localized odours from mining, extraction plant and tailings pond could occur.**

ACTION
- **Floating roof storage tanks**
- **Naptha recovery system**
- **Mine depressurization water treated for H2S removal**
- **HTFT system minimizes leakage**
- **Vapour recovery or incineration systems**

SITE

9.4.1.1

AIR QUALITY

Bitumen Production

A-5

Heavy metal emissions will result in increased ambient concentrations and deposition of these compounds.

RECORD

- **Not valid for OSLO (no coke or bottoms are combusted)**

ACTION

- **No mitigation required.**

9.4.1.1

AIR QUALITY

Bitumen Production

A-6

Emissions of NOx and volatile organic compounds (VOC's) from OSLO and/or other operations will result in increased ozone concentrations.

RECORD

- **Not valid for OSLO**

ACTION

- **Low NOx burners**
- **VOC emission control program**

9.4.1.1

AIR QUALITY

Bitumen Production

A-7

Emissions of greenhouse gases from OSLO and/or other operations will contribute to global warming and climate change.

RECORD

- **Greenhouse gas emissions and full cycle inventory study in progress (CO2 emissions est. approximately 3.5 Mt/yr).**

ACTION

- **Greenhouse gas emissions task force examining alternatives for minimizing controllable emissions. Report available by late March, 1991.**
- **Base case features that minimize emissions will be described and additional measures to be considered during detailed design will be listed.**

9.4.1.1

AIR QUALITY

SITE

Bitumen Production

A-8

OSLO mining and tailings management operations will result in increased dust in the development area.

RECORD

- **Localized increases will occur due to mine-related traffic and due to wind erosion from tailings pond dykes.**

ACTION

- **Utilize paving and dust suppressant on haul roads.**
- **Revegetate tailings dykes as quickly as possible.**
- **Higher tailings fines content may limit susceptibility to wind erosion.**

9.4.1.1

AIR QUALITY

Bitumen Production

A-9

Smoke and fog will increase project visibility to observers and will decrease ground level visibility for vehicle drivers.

RECORD

- **Only very localized fogging of on-lease roads is anticipated.**

ACTION

- **Local traffic control.**

9.4.1.2

WATER QUALITY & QUANTITY

Bitumen Production

W-1

Site activities will change sediment loads in the Muskeg River and its tributaries.

RECORD

- **Not valid for 1:10 year or less severe flood**
- **Valid for >1:10 year events**

ACTION

- **Runoff and diversion sytems routed through sedimentation ponds and /or Kearl Lake**

9.4.1.2

WATER QUALITY & QUANTITY

SITE

Bitumen Production

W-2

Release of treated basal aquifer water, sewage and air emissions will change the quality of local surface water.

RECORD

- Not valid for OSLO air emissions

Proposed effluents have been modelled for both discharge to Kearl Lake and Athabasca River. Discharge to Kearl Lake not foreseen at this time.

ACTION

- Treated mine depressurization water and sanitary sewage will be discharged to the Athabasca River.

9.4.1.2

WATER QUALITY & QUANTITY

Bitumen Production

W-3

Site activities will alter flow rates in the Muskeg River and its tributaries.

RECORD

- Diversion and run-off control systems will minimize effects for up to 1:10 year floods.

ACTION

- Diversion systems flow through Kearl Lake and/or seimenation ponds where peak flows (<1:10 year) are held within the natural range.

9.4.1.2

WATER QUALITY & QUANTITY

Bitumen Production

W-4

Water withdrawl and release of treated effluent to the Athabasca River will alter its quality.

RECORD

- Modelling shows very localized elevation of some parameters under extremely low flow conditions.

ACTION

- Target zero discharge of process water
- Treated mine depressurization water aerated before discharge
- Pilot test mine depressurization water treatment process prior to start-up. If bioaccumulation of chlorinated organics occurs in aquatic organisms, switch to azonation or air stripping and chlorination treatment systems.
- No discharge during winter

9.4.1.2

WATER QUALITY & QUANTITY

SITE

Bitumen Production

W-5

Surface and groundwater management activities will alter the regional abundance of groundwater.

RECORD

•Near surface and basal aquifer flows will be intercepted by the mine depressurization pumping well system within an approximately 10 km. radius.

ACTION

•No action possible during operation phase-must maintain mine in dry condition.

•Regional groundwater systems will recover in 1-5 years following cessation of pumping.

9.4.1.2

WATER QUALITY & QUANTITY

Bitumen Production

W-6

Seepage from tailings ponds, other storage ponds and the mine will reduce regional groundwater quality.

RECORD

•Tailings pond seepage may form a portion of winter flow in Jackpine Creek via the Pliestocene channel aquifer.

ACTION

•Monitor seepage

•Consideration being given to pump in/out barriers, surface collection works and/or grout-cut-off barriers and /or shifting pond to a more favourable location (~1/2 km S.E. of present location).

9.4.1.3

AQUATIC RESOURCES

Bitumen Production

AR-1

Project water management activities will change the quality and availability of fish habitat.

RECORD

•Drainage and diversion systems will eliminate some habitat for coarse fish such as minnow and sucker species.

ACTION

•Diversion systems avoid impact on Jackpine Creek.

•"No net loss" policy for fish habitat adopted by project.

•Incorporate habitat enhancement features where feasible, and participate in cooperative, regional fish habitat enhancement projects, if they are developed in the future.

9.4.1.3

AQUATIC RESOURCES

SITE

Bitumen Production

AR-2

Increased fishing pressure and habitat loss will increase fish mortality.

RECORD

- May be valid for some sport species such as grayling.

ACTION

- Fishing regulations / control adjustments may be required.
- Cooperative, regional fisheries enhancement project may be required to improve recreational fishing opportunities.

9.4.1.3

AQUATIC RESOURCES

Bitumen Production

AR-3

Changes in habitat and increased fish mortality will result in regional reductions in fish abundance.

RECORD

- Valid for sport species such as grayling.

ACTION

- Mitigation as above for AR-1 and AR-2.

9.4.1.3

AQUATIC RESOURCES

Bitumen Production

AR-4

Project water management activities will change the amount and quality of aquatic wildlife habitat.

RECORD

- Localized impacts on beaver, muskrat and waterfowl (1 - 10%, moderate term decreases).

ACTION

- Manage Kearl Lake water levels to improve emergent vegetation.
- Implement wildlife protection strategy for tailings pond.
- Design end-pit lake to support aquatic wildlife.

9.4.1.3
AQUATIC RESOURCES

SITE
Bitumen Production

AR-5
Project activities will increase direct mortality of aquatic wildlife.

RECORD

- **Localized impacts on beaver, muskrat and waterfowl (1 - 10%, moderate term decreases).**

ACTION

- **Manage Kearl Lake water levels to improve emergent vegetation.**
- **Implement wildlife protection strategy for tailings pond.**
- **Design end-pit lake to support aquatic wildlife.**

9.4.1.3
AQUATIC RESOURCES

Bitumen Production

AR-6
Reduced habitat capability, disturbance and direct mortality will change the abundance of aquatic wildlife.

RECORD

- **Localized impacts on beaver, muskrat and waterfowl (1 - 10%, moderate term decreases).**

ACTION

- **Manage Kearl Lake water levels to improve emergent vegetation.**
- **Implement wildlife protection strategy for tailings pond.**
- **Design end-pit lake to support aquatic wildlife.**

9.4.1.3
AQUATIC RESOURCES

Bitumen Production

AR-7
Project activities will change aquatic plant communities.

RECORD

- **Valid for vegetation surrounding Kearl Lake due to fluctuating water levels.**

ACTION

- **Kearl Lake water levels will be managed to enhance growth of aquatic plants for the benefit of semi-aquatic mammals.**
- **Reclamation of disturbed areas to include aquatic plants.**

SITE

.4.1.4
TERRESTRIAL
RESOURCES

Bitumen Production

TR-1
Project development will change landforms.

RECORD
- **Valid, overburden dumps, tailings sands dumps will create 35 - 45 m hillocks where there previously was flat treed muskeg.**
- **End pit lake will be created in a former treed muskeg area.**

ACTION
- **Reclamation plan will ensure that such raised areas are revegetated with appropriate species.**
- **End-pit lake will be reclaimed to a productive aquatic ecosystem.**

9.4.1.4
TERRESTRIAL
RESOURCES

Bitumen Production

TR-2
Project development and operation will change soil chemistry.

RECORD
- **Not valid for OSLO air emissions.**

ACTION
- **None required.**

9.4.1.4
TERRESTRIAL
RESOURCES

Bitumen Production

TR-3
Project development and operation will change soil capability.

RECORD
- **Limited to areas directly disturbed by project facilities.**

ACTION
- **Soil salvage and progressive site reclamation.**

9.4.1.4

TERRESTRIAL RESOURCES

SITE

Bitumen Production

TR-4

Project development and operation will increase plant mortality.

RECORD

- **Limited to area directly disturbed by project facilities.**
- **No rare or endangered species.**

ACTION

- **Revegtation with mix of species specified in D&R plan required to meet end land use objectives.**

9.4.1.4

TERRESTRIAL RESOURCES

Bitumen Production

TR-5

Project reclamation and plant mortality will change plant community structure and diversity.

RECORD

- **Limited to area directly disturbed by project facilities.**
- **No rare or endangered species.**

ACTION

- **Revegtation with mix of species specified in D&R plan required to meet end land use objectives.**

9.4.1.4

TERRESTRIAL RESOURCES

Bitumen Production

TR-6

Changes in plant communities will alter the availability and quality of terrestrial wildlife habitat.

RECORD

- **Limited to areas directly occupied by project facilities.**

ACTION

- **Include species / communities of value to wildlife in site reclamation programs.**
- **No net loss of habitat policy -- may contribute to regional habitat enhancement projects.**
- **Wildlife monitoring to document effects.**

9.4.1.4

TERRESTRIAL RESOURCES

SITE

Bitumen Production

TR-7

Project activities, reduced habitat capability and increased mortality will change the abundance of terrestrial wildlife.

RECORD

- For some species sensitive to human disturbance, effects will extend .5 to 1 km beyond the limits of project facilities.
- Moose, black bear, spruce grouse, snowshoe hare and red-backed vole are VEC's affected: local populations will decrease 1-10% over long term.

ACTION

- Include species / communities of value to wildlife in site reclamation programs.
- No net loss of habitat policy -- may contribute to regional habitat enhancement projects.
- Wildlife monitoring to document effects.

9.4.1.5

RESOURCE USE

Bitumen Production

RU-1

Changes in plant vigour and mortality and plant reclamation will change the timber harvest potential .

RECORD

- 1-10% loss of harvested species in area directly affected by project facilities.

ACTION

- Reclamation with harvested species will replace forestry capability.

9.4.1.5

RESOURCE USE

Bitumen Production

RU-2

Changes in fish populations and tainting of fish will change fishing opportunities in the region.

RECORD

- No tainting of fish anticipated
- Increased fishing pressure likely

ACTION

- On-site habitat enhancement, if feasible
- Contribute to cooperative, regional fisheries enhancement projects
- Fishing regulation adjustments may be required

9.4.1.5

RESOURCE USE

SITE

Bitumen Production

RU-3

Changes in access and in the abundance of aquatic and terrestrial wildlife will change hunting and trapping opportunities in the region.

RECORD

- Regional effects, <1%, long-term, decrease.

ACTION

- Trapper compensation policy
- Reclaim to game species habitat
- Contribute to off-site enhancement projects
- Hunting regulation adjustments and increased enforcement may be required

9.4.1.5

RESOURCE USE

Bitumen Production

RU-4

Changes in vigor and abundance of vegetation will change opportunities for berry picking and root gathering in the region.

RECORD

- Local, <1%, long-term, decrease due to site clearing and increased numbers of people.

Population - 34,000

ACTION

- Reclaim some disturbed sites to early successional berry producing shrubs.

9.4.1.5

RESOURCE USE

Bitumen Production

RU-5

Project related activities and effects in air and water quality, surface hydrology and fish and wildlife resources will alter land and water based recreational opportunities in the region.

RECORD

- Local to regional effects, <1%, long-term decrease.
- Decreased wildlife abundance
- Decreased aesthetics due to industrial activities

ACTION

- Retain natural vegetation buffers where possible
- Dust control
- Phased reclamation

9.4.2.0		SITE
ENVIRONMENT	EIA Hypotheses - Upgrader Site	Upgrader

Hypotheses statements summarize stakeholder consensus on potential project-related impacts on valued environmental components (VEC's) in the OSLO upgrader area.
(Note: Additional details on the hypotheses are available on request to OSLO).

RECORD

Valid hypotheses were subject to development of impact mitigation and management plans at EIA workshop #5 on December 13, 1990. The following statements summarize consensus on the validity of the impact hypotheses and the scope, magnitude and seriousness of the predicted impacts.

ACTION

The following statements summarize impact mitigation and mangement actions that will be taken by OSLO (and where applicable, by others) to limit impacts to acceptable levels and to verify the effectiveness of these actions during project operation.

9.4.2.1	
AIR QUALITY	Upgrader

A-1

Increased SO2 concentrations and deposition.

RECORD

- **•SO2 concentrations greater than background but less than ambient air quality standards.**
- **•SO2 concentrations greater than ambient standard will occur for brief periods under upset conditions and adverse atmospheric conditions for dispersion.**

ACTION

- **•Air emissions (S)2, NOx) hypotheses, predicted impacts and proposed mitigation plans will be reviewed in detail with key local stakeholders at a working session in the Redwater area in late February or early March, 1991.**
- **•Sulphur recovery unit and incinerator limit emissions to 20 - 25 t/d SO2.**
- **•Stacks, flares ensure proper dispersion.**

9.4.2.1

AIR QUALITY

SITE

Upgrader

A-2

Increased NOx concentrations and deposition.

RECORD

- **NOx concentrations greater than background but less than ambient air quality standards.**

ACTION

- **Low NOx burners**
- **Stacks, flares ensures proper dispersion.**

9.4.2.1

AIR QUALITY

Upgrader

A-3

Odours resulting from fugitive H2S and hydrocarbon emissions.

RECORD

- **Onsite odors with occasional off-site odours during upset conditions.**

ACTION

- **Floating roof tankage**
- **Vapour recovery systems**
- **Active leak detection monitoring programs**
- **Covered API separator**

9.4.2.1

AIR QUALITY

Upgrader

A-4

Project emissions of greenhouse gases will contribute to global warming and climate change.

RECORD

- **Greenhouse gas emissions and full cycle inventory study in progress (CO2 emissions est. approx. 3.5 MT/year). •Greenhouse gas emissions task force examining alternatives for minimizing emissions.**
- **Base case features and additional measure to be examined during detailed design will be described.**

ACTION

Report available by late May, 1991.

9.4.2.1
AIR QUALITY

SITE
Upgrader

A-5
Water vapour emissions will decrease ground level visibility for drivers.

RECORD

- **Localized fogging will occur and may drift to local roads.**

ACTION

- **Locate cooling towers away from high traffic roads.**
- **Lower speed limit during fog events.**

9.4.2.1
AIR QUALITY

Upgrader

A-6
Site activities will create dust.

RECORD

- **Very localized effects.**

ACTION

- **Pave or apply dust suppressant to on-site roads.**

9.4.2.2
WATER QUALITY & QUANTITY

Upgrader

W-1
Site stormwater management will change water quality and flows in local drainage.

RECORD

- **Not valid since local drainage patterns not significantly altered.**

ACTION

- **Storm water management systems will ensure that water qualy / flows maintained within natural regime for 1:10 year events.**

9.4.2.2

WATER QUALITY & QUANTITY

SITE

Upgrader

W-2

Release of treated non-process water to the North Saskatchewan River will adversely affect water quality.

RECORD

•Not valid (modelling results show localized water quality improvement).

ACTION

No water released until discharge quality standards are met.

9.4.2.2

WATER QUALITY & QUANTITY

Upgrader

W-3

Disposal of unstripped sour water via deep disposal wells may contaminate rear-surface aquifers.

RECORD

•Not valid for OSLO disposal system.

ACTION

•Disposal to very deep (>2000 m) formations is proven technology.
•Double casing with interstitial monitoring required.
•Annual tracer surveys.

9.4.2.2

WATER QUALITY & QUANTITY

Upgrader

W-4

Site activities such as leaks and spills will contaminate suface aquifers.

RECORD

•Not valid .

ACTION

•All ponds, storage sites, etc. containing hazardous material will be lived and underlying goundwater quality will be monitored.

9.4.2.3

AQUATIC RESOURCES

SITE

Upgrader

AR-1

Project construction will result in loss of aquatic vegetation communities.

RECORD

- **Valid for areas directly affected by construction.**

ACTION

- **Retain some wetland in perimeter buffer and final reclamation to include aquatic vegetation.**

9.4.2.3

AQUATIC RESOURCES

Upgrader

AR-2

Increased human presence will result in increased fishing pressure on the North Saskatchewan River.

RECORD

- **Valid, but fish generally not considered fit for human consumption.**

ACTION

- **None required.**

9.4.2.3

AQUATIC RESOURCES

Upgrader

AR-3

Project construction will result in loss of habitat for aquatic wildlife.

RECORD

- **Valid for habitat directly affected.**
- **Dabbling ducks, beaver and wood frogs will decrease in abundance locally <1%.**

ACTION

- **Retain some wetland habitat in perimeter buffer.**
- **Reclamation to include some wetland habitat.**

9.4.2.4

TERRESTRIAL RESOURCES

SITE

Upgrader

TR-1

Project development and operation will change soil chemistry and capability.

RECORD

- **Directly affected soils will be implemented.**
- **Regional sandy soils may be susceptible to ocidification.**

ACTION

- **Soil salvage and stockpiled for respreading upon final abandonment.**
- **Air emission control.**
- **Monitoring.**

9.4.2.4

TERRESTRIAL RESOURCES

Upgrader

TR-2

Changes will occur in terrestrial plant vigor and mortality.

RECORD

- **Localized removal of vegetation.**
- **Some vegetation stress may result from air emissions during plant upsets.**

ACTION

- **Retain vegetation buffer**
- **Air emission controls**
- **Monitoring - periodic surveys for stress or damage.**

9.4.2.4

TERRESTRIAL RESOURCES

Upgrader

TR-3

Changes will occur in terrestrial plant community structure and diversity.

RECORD

- **Permanent loss of control vegetation.**
- **Temporary reduction in production locally.**

ACTION

- **Emission controls**
- **Monitoring**

9.4.2.4

TERRESTRIAL RESOURCES

SITE

Upgrader

TR-4

Changes in availability and quality of terrestrial wildlife habitat and in abundance of terrestrial wildlife.

RECORD

- White tailed deer will decrease locally 1-10% over the long-term due to increased hunting, vehicle collisions and habitat fragmentation.
- Coyote, partridge, red-backed vole, snowshoe hare and songbirds will decrease locally <1%.

ACTION

- Retain natural vegetation buffers
- No net loss habitat policy
- Off-site habitat improvement
- Fencing, signs
- Reclamation

9.4.2.5

RESOURCE USE

Upgrader

RU-1

Change in hunting opportunities

RECORD

- Very localized changes (reduced opportunities).

ACTION

- Reclamation
- Off-site habitat improvement

9.4.2.5

RESOURCE USE

SITE

Upgrader

RU-2

Changes in aesthetics.

RECORD

- Rural lands changed to industrial use, but adjacent to other heavy industry.

ACTION

- Retain buffers
- Landscaping
- Reclamation

9.4.2.5

RESOURCE USE

Upgrader

RU-3

Changes in quality and quantity of cultivated crops, hay and pastureland.

RECORD

- Area occupied by facilities will be out of production for duration of the project.

ACTION

- Air emission controls (see comments under 9.4.2.1 - A-1).
- Poorer class agricultural land selected.
- Reclamation
- Monitoring

9.4.2.5

RESOURCE USE

Upgrader

RU-4

Reduction in livestock capability (poultry, cattle, horses, swine).

RECORD

- Area occupied out of production for duration of project.
- Noise from flaring may adversely affect poultry.

ACTION

- Minimize noise.
- Located flares as far away as possible from poultry operation.
- Monitoring
- Reclamation

10.1.0.0

SOCIO-ECONOMIC

Impact Assessment Process, Public Consultation

SITE

Bitumen Production

Stakeholder understanding of the process to ensure they have input to the identification, evaluation, and mitigation of issues.

RECORD

Completed a socio-economic scoping study in 1985. OSLO ART established in Jan. 1989. RMC contracted for overall SEIA preparation May 1989. Contracted with Ft.Mckay to do self assessment studies. Jointly funding ANDC skills assessment study, data gathering completed Jan.'90. Aboriginal Subcommittee of ART formed Jan. '90. Full time Native Affairs Contact on OSLO staff. Ft. McMurray Information Office opened November 1989.Establishment of Ft. McMurray Infrastructure sub-committee, May 1989. Community social services Forum, Feb. 2. Report out to OSLO ART in March, 1990. Being reviewed by community experts-final report to OSLO by Nov./90.

Ft. McKay Employment/Training and Business Development studies completed Sept/90.

RMC reviewed all available ANDC skills inventory computer data Q4'90.

Validation of impacts based on revised project completed in December, 1990.

Draft SEIA reviewed by subcommittees December 1990.

ACTION

ANDC skills inventory computer data analysis to be completed Q1, 1990.

Defered to Q490.

Summary SEIA to be completed May, 1991.

SEIA wrap-up workshop to be held May 30, 1991.

10.1.1.0

Review SEIA Process and obtain consensus on key issues.

Upgrader

RECORD

Open houses conducted in September / October / November with Redwater, Smokey Lake, Gibbons, Lamont and Ft. Saskatchewan. Socio-economic issues collected from process.

Invited local representative to attend A.R.T. Socio-economic workshop with key leaders in area in December, 1990 to focus on key issues and develop mitigative plans.meetings.

ACTION

Follow-up workshop scheduled for June 3, 1991

10.1.2.0

Prepare baseline analysis of Redwater area.

SITE

Upgrader

RECORD

Conducted literature search and carried out series of personal contacts during September / October, 1990. Validation process in December with baseline and impact evaluations complete.

ACTION

As per 10.1.1.0

10.2.0.0

SOCIO-ECONOMIC

Business Opportunities

Bitumen Production

Need to ensure local, Alberta, and Canadian companies provided opportunities to obtain benefit from the project.

RECORD

Agreement with Business Development Center and City of Fort McMurray to produce a local Business Directory (Complete). As part of Binding Agreement undertakings, OSLO is developing Industrial Benefits Plan to include project position on contracting, procurement, quality assurance, modularization, and major contractor obligations, monitoring and reporting toward undertaking committments.
Reviewed outline contents at Nov, 1989 OSLO ART meeting. ERCB attending I.B.P. meetings. Various drafts of Industrial Benefits Plan(I.B.P.) reviewed with ART Aboriginal Affairs Subcommittee and Ft. McMurray Subcommittees in Q2 & Q3/90.
Business Forum held April 28/90.
Final draft prepared following meeting November 7 with Alberta Ind. Ben. Group (A.I.B.G.). Will be reviewed by A.I.S. on November 27th and go to AIBG for government approval in December.
OSLO responded to Business Forum report by incorporating recommendations into IB/HR plans and also directly to Ft. McMurray Economic Dev. Department.

ACTION

Final comments exchanged, awaiting Alberta Government endorsement.

SITE

10.3.1.0

SOCIO-ECONOMIC | Employment | Common

Need to ensure local, Alberta, and Canadian people are provided with the opportunities for meaningful employment generated by the project.

RECORD

Developed Human Resource Plan (HRP) **as a strategic framework. Following appropriation, OSLO will develop detailed action plans to include** project position on employment equity, recruiting strategy, on the job training plans, labor supply/demand analysis, direct, indirect and induced employment opportunities, obligations of contractors, as well as monitoring and reporting commitments. RMC consultants developing labor/skills supply using Canada census, Ft.McMurray census and other appropriate data. Reviewed outline of HRP at OSLO ART in Nov.1989. Received agreement from Alberta Government on multiplier for jobs. Obtained career development studies on labor supply/demand forecasts to 1994.

ERCB attending future meetings of HRP team.

Ft. Mackay and ANDC studies to address this issue. Reviewed with OSLO ART Aboriginal Affairs Subcommittee and Ft. McMurray Subcommittee in Q3/90.

Initial feedback recieved on H.R./I.B. plans from A.I.S.-more to come following workshop June 25-27.

Incorporated input from A.I.S., ANDC/ATC, Aboriginal workshop, Ft. McMurray subcommittee into final plan.

ACTION

Final review with Career Development in October 1990 - awaiting endorsement--timing as per Industrial Benefits Plan.

10.3.2.0

SOCIO-ECONOMIC | Training | Bitumen Production

Need to plan for appropriate skills in the potential workforce prior to construction start, as well as for skill development during operations phase.

RECORD

Request by OSLO to Fed/Prov. Gov'ts to respond to issue of flexibility in training programs to develop qualified local labor market. **Gov't not prepared to respond on programs until H.R./I.B. plans approved.**

ANDC supported in developing skills inventory data base. Ft. Mackayemployment and training study **completed Q3/90.** Meetings with Keyano College to ensure they are aware of OSLO schedule and status and attended Alberta Resource Council workshop on future training and labor needs. Regional Training Network established, consisting of representatives of Keyano College, Career Development and Employment, Canada Employment and Immigratioon, Community Futures, and OSLO. OSLO representative appointed to Local Advisory Council to Canada Employment Centre.

ACTION

Ongoing discussions with communities and Keyano College. Suggestion by Ft.Mackay that Athabasca Tribal Corporation be requested to join the Regional Training Network. **ANDC skills inventory analysis deferred until Q4/90.**

July 1, 1991

10.4.0.0

SOCIO-ECONOMIC

Community Infrastructure Impacts

SITE

Bitumen Production

Identification, evaluation, and mitigation by appropriate stakeholders of issues involving the potential impact to the local area from the project for both construction and operations.

RECORD

Contacts made with City, AHMC, Municipal Affairs, Mental Health, Alcohol and Drug Treatment, Hospitals, etc. to develop baseline data and initial issue scoping. Ft. Mckay received gov't funding to do community impact assessment. Meetings held with ART Ft. McMurray subcommittee to assist in identification of issues and focusing on mitigative measures. OSLO opened Ft.McMurray Community Information Office Nov. 1989 to act as focal point for public contact. SEIA baseline data and initial issues scoping complete by Nov.30,1989. **Construction and Operations workforce ramp up incorporated into Impact Model for Alberta Communities Over Time(I.M.P.A.C.T.) to provide analysis of all infrastructure impacts. First model run completed in August, sensitivities were run in November.**
Industry, government agreed to funding Ft. McKay administrative needs, finalizing objectives and stewardship process.
Ft. Mckay community impact study completed Sept. 1990 by Ted Van Dyke. Analysis of Fort McMurray results of IMPACT occurred in Q4/90.
Discussed Ft. McMurray recreational study with city and consultant - final report completed March, 1991. Ft. McMurray community needs assessment discussion held with City and consultant. Report due April, 1991.

ACTION

10.4.1.0

Ensure Alberta Transportation aware of project impacts on local roads - for construction and operations.

Upgrader

RECORD

Obtained AADT connections from Alberta Transportation for key routes / intersections in area. Reviewed Alberta Transportation plans for area and advised them of concern raised at open houses. Meeting held November 28, 1990 to identify transportation impacts and issues for future action by Alberta Transportation with respect to OSLO.

ACTION

No near term actions planned

10.5.0.0

SOCIO-ECONOMIC

Tax Transfer

SITE

Bitumen Production

Need to encourage development of a tax sharing formula to ensure Ft. McMurray receives appropriate share of revenues from industrial development in relationship to level of services being provided.

RECORD

Identified prior areas(eg. Cold Lake, Rocky Mtn. House) where similar issues were resolved. Letter to J. Shields on Northern Allowance issue. Current year tax shortfall resolved by Ft.McMurray--short term solution through special disbursement from Alta Municipal Affairs.
City may annex operating plants if not able to agree on long term solution with Municipal Affairs.

ACTION

Ft.McMurray planning to approach Province to resolve issue. OSLO will support City as appropriate. City School Board boundaries do not include OSLO site. Mayor Collicott working with provincial authorities, may establish a 'round table' to discuss Tax issue. Group would include major industry reps, key gov't departments. **Issue is being addressed by negotiations between the City and the I.D.**

10.6.0.0

SOCIO-ECONOMIC

Native Community Issues

Bitumen Production

Need to ensure all native communities and relevant organizations have opportunity to address their unique issues relative to the OSLO project potential impacts and benefits, including trapper compensation, quality of life, and cultural impacts. Aboriginal Issues Subcommittee of ART formed in Jan. '90

RECORD

OSLO ART meetings include ANDC and Ft. Mckay and provide opportunity for their issues to be raised.
Trappers Compensation proposal presented to Ft. Mckay in April 1989. Traditional pursuits study for Ft. McKay has been completed and will be incorporated into EIA/SEIA. Second series of community and school meetings with all local communities occurred Jan - March 1990. Metis Association and Indian Association involvement discussed with ANDC - agreed they don't need to be directly involved in ART. OSLO continuing to attend FMIC meetings.Three day workshop held June/90. Ken Shipley Management Service retained by ANDC to prepare report.
Ft. Mckay to respond to OSLO on Trappers Compensation Policy proposal. Aboriginal Issues Subcommittee of ART formed in Jan. '90. See planning notes attached to Aboriginal Issues subcommittee terms of reference. Aboriginal workshop report.
Ft. McKay "position papers" on socio-economic and environmental issues have been received and are dated December 3, 1990 and January, 1991, respectively.

ACTION

Aboriginal workshop report completed and reviewed by AIS October 24th. Feedback to go to ERCB by November 15th for discussion at next AIS November 27th. Agreed report could form a basis for AIS report to ART. Community validation in April 1991, final AIS meeting scheduled for May 30, 1991

10.6.1.0
SOCIO-ECONOMIC | Aboriginal Program | SITE: Bitumen Production

Aboriginal community economic development and related admin., business, and employment issues require special initiatives by OSLO to minimize impacts on native communities.

RECORD

Roadmap and draft Aboriginal Involvement Program being developed and reviewed with project team and owners for feedback. Program includes both Business Development and Employment considerations.
Obtained input from external stakeholders.

ACTION

Policy developed for incorporation into HR/IB strategies. **Second review with Owners in November, 1990. Formal adoption will occur in December, 1990.**
Advancing "ROADMAP" Process to address current stages of Project.

10.6.2.0
SOCIO-ECONOMIC | Native community Housing and Infrastructure needs | Bitumen Production

Need to ensure requirements identified and mitigative measures in place before impacts begin to be felt

RECORD

Ft. McKay community needs assessment study funded by Municipal Affairs. Dr. Ted Van Dyke hired to prepare report. Report complete and being reviewed by government.

ACTION

Confirming assessment of limited infrastructure impacts from project development.

10.7.0.0
SOCIO-ECONOMIC | Construction/Operations Transition | Common

Need to develop training plans for skills transition, and long term local business development to recognize both construction and operations needs to "level" impacts on the local area.

RECORD

Cross functional project teams formed representing construction and operations planning.
Business and employment strategies are being developed to consider long term needs as well as construction needs and are incorporated as a "first layer" in the I.B./H.R. Plans.
Project will work with Business Development Centre and Industry for ongoing business development opportunities, and with Keyano College and governments on long term training needs. Fort McMurray Industrial Forum held April 28, 1990. Dialogue on opportunities and issues relating to local business and contracting opportunities will be ongoing.

ACTION

Commitment made in I.B./H.R. Plans to proceed to "second layer" post appropriation which would include Business Development and Employment / Training plans.

SITE

11.0.0.0
REGULATORY REQUIREMENTS

Major Regulatory Approvals

Common

Several regulatory approvals are required at the pre-appropriation , pre-construction and operating stages. The work required to obtain the approvals must be carefully planned to ensure orderly decision making as the project proceeds.

RECORD

Key pre-appropriation approvals will include: ERCB Project Approval; ERCB Industrial Development Permit; ERCB Power Plant Approval; I.D.18N Development Permit and **M.D. of Sturgeon Development Permit.**
Key **pre-construction** approvals will include: Development and Reclamation Approval; Clean Air Permit; Clean Water Permit; Water Resources Permits; ERCB Pipiline Permits; Heritage Resource Clearance; and Surface Rights Approvals. Draft pre-appropriation regulatory work plan prepared in Dec, 1989.
Post-appropriation regulatory work plan described in the Project Execution Plan(PEP).

ACTION

11.1.0.0
REGULATORY REQUIREMENTS

ERCB APPLICATION

Common

ERCB Approval for the OSLO Project is required to enable the Owners to appropriate. This approval embodies the statutory regulatory review process of all affected provincial agencies, public participation, and **cabinet** review (Order in Council).

RECORD

The OSLO Application Review Team (ART) was established at the begining of 1989 to provide a forum for resolution of issues prior to the public hearing.
An Issues Management Plan is in place which summarizes the status and required actions on key issues. A number of ART sub-committees have been
formed that review issues in detail. Geology and Mining subcommittee work complete. **The decision was made in April, 1991 to suspend for this ERCB**
application work.

ACTION

Subcommittees will document design basis review progress up to April, 1991. ART will issue interim report documenting progress to date and go-forward recommendations.

11.2.0.0
REGULATORY REQUIREMENTS

Binding Agreements

Common

Agreement between the Alberta government and the OSLO Owners is required in the areas of fiscal terms, taxation, royalties, and undertakings on environment, technology, industrial benefits, employment, and training.

RECORD

The Statement of Principles was signed by , Canada, Alberta, and the OSLO Owners in Sept.1988. Agreement was reached on wording of the Undertakings in July 1989. In February 1990 the Federal Gov't. withdrew from post-appropriation participation in the project. In June 1990, Fed. Gov't agreed to help fund the pre-appropriation costs. A similar pre-appropriation agreement was signed with Alberta in October, 1990.

ACTION

Discussions are ongoing with the Alberta and Federal Gov'ts on a post-appropriation agreement.

July 1, 1991

11.2.1.0

REGULATORY REQUIREMENTS | Federal/Alberta Environmental Assessment Review

SITE

Common

Efficient use of OSLO Project and Federal/**Alberta** government agency resources will be best achieved by a joint **environmental** review process. This objective is stated in the binding agreement undertakings. The Canada-Alberta joint agreement on environmental management **expired** in May 1989, pioneering the joint Al-Pac pulp project review process **and other Federal/Provincial resource management issues have** delayed an OSLO process agreement.

RECORD

OSLO has initiated and held informational meetings with Federal and Alberta agencies to try to meet the current parallel needs. An intergovenmental committee was established **in 1989** to develop a joint process. Agreement in principle on a co-operative process was announced by the Alberta and Federal Environment Ministers in January, 1990. The formal agreement has not as yet been signed. **OSLO ART has functioned as a joint process with active Federal participation since February, 1990.** Federal government formally requested **by OSLO in November, 1990** to appoint an **EARP** initiating department.

ACTION

Follow-up with **Alberta** and Ottawa to ensure **progress is reaching** agreement is formally **documented.** OSLO will continue to encourage both levels of government to implement the co-operative process through **to complete this phase of ART** direct participation by federal officials on ART and the Environmental Sub-committee.

11.3.0.0

REGULATORY REQUIREMENTS | SCO markets

Upgrader

Statement of Principles provides for international market access and exemption from prorationing for OSLO Synthetic Crude Oil. Economic assessment of the project requires a long term Canadian supply-demand forcast. NEB export policy and regulatory compliance is required.

RECORD

OSLO conducting detailed market analysis to support the economic assessment requirements of the ERCB application and the appropriation request of the owners.

ACTION

Ongoing monitoring

11.4.0.0

REGULATORY REQUIREMENTS | Fuel Gas Supply

Common

Economic assessment of the project requires gas supply-demand price forecast. Alternate fuels will also be considered.

RECORD

OSLO has conducted an alternate fuels study which confirmed natural gas as the most economically and environmentally acceptable fuel. Economic analyses of the project will be based on current public gas supply forecasts.

ACTION

Document in DBM and Class III estimate.

11.5.0.0

REGULATORY REQUIREMENTS

PIPELINE AVAILABILITY

SITE

Common

Economic assessment of the project requires confirmation of SCO and gas pipeline capacity within Alberta and to end markets.

RECORD

Reconfiguration of the Project has changed the pipeline requirements significantly.
Work completed to confirm gas, diluent and dilbit pipeline requirements. Third party proposals for construction and operation **received January, 1991.**

ACTION

Discussions postponed with possible suppliers pending project go-forward timing.

11.6.0.0

REGULATORY REQUIREMENTS

Major Business Agreements

Common

Agreements will be required in the areas of upgrading technology, gas supply, pipelines, power, trappers compensation, roads, forestry rights, and potentially other business areas

RECORD

Upgrading agreements signed. Others are being pursued as part of the overall business strategy. Developed schedule(Dec. 1989) to ensure all necessary agreements are identified and concluded in the appropriate time with respect to the appropriation decision.

ACTION

Conclude existing agreements. Postpone other discussions pending project go-forward timing.

12.0.0.0

PROJECT MANAGEMENT

Feasibility Studies

Common

Early planning studies have been undertaken on the project, identifying the viability of proceeding with the commercial proposal. ART requested access to this preliminary information.

RECORD

Early feasibility information was make available through the May 1989 review as well as in the Preliminary Review document provided to OSLO ART in April'89.

ACTION

No further action required.

12.1.0.0

PROJECT MANAGEMENT

PROJECT BASIS MEMORANDUM (PBM)

SITE

Common

ERCB want to review the information contained in the PBM

RECORD

The May'89 review was an early version of a "table-top" design review. The actual PBM contains proprietary information subject to licencing agreements and is not a public document.

ACTION

No further action required.

12.2.0.0

PROJECT MANAGEMENT

Project Costs

Common

A detailed cost benefit analysis will be required on the project. Capital costs of the development as well as long term operating cost projections need be explained.

RECORD

Costs are being developed now with an early scoping target being the $4.1-4.5 B as laid out in the Statement of Principles. A consultant has been retained to pursue the cost-benefit portion of the study. Cost trending is a monthly review item in the project.

ACTION

Review overall project costs, including operating cost estimates with OSLO ART in Q1, 1991.

12.2.1.0

PROJECT

Sustainable Development

Common

The project will be required to demonstrate consistency with the principles of sustainable development...the notion that development of resources today must not jeopardize the ability of future generations to sustain themselves. This is to be accomplished by closely integrating environmental and economic decision making.

RECORD

Governments and Industry are developing definitions , policies and programs to translate the general direction on SD given by the WORLD COMMISSION ON THE ENVIRONMENT into operational terms. OSLO has developed a project policy that will demonstrates consistency with and will assist in operationalizing the concepts embodied by SD.

ACTION

Update policy statement and accompanying guidelines on an ongoing basis and continue to weave SD concepts into all project communications.

13.1.0.0 COMMUNICATIONS

Issues Identification

SITE

Common

OSLO will prepare and update an issues management summary to assist in keeping track of the public and community issues as raised by OSLO ART and other community contacts. This will facilitate a record of issues raised, the actions taken, and the concerns resolved prior to a Public Hearing.

RECORD

The summary will be distributed to key stakeholders as a communications tool for identifying issues currently being worked on. Distribute Summary and seek input and updates from ART.

ACTION

Ongoing updates.

Update to Project Preliminary Outline to reflect scope changes, technology choices and process plans.

13.2.0.0 COMMUNICATIONS

COMMUNITY LIASON

Bitumen Production

Key to meaningful participation in project decisions at the design stage is the availability of project contacts to the community.

RECORD

A full time OSLO community liason has been working in the region since June'89, and a Community Information Office is open(Dec.1, 1989) in Fort McMurray. The Project has participated at community sponsored events in the fall of 1989, presenting the "project display" to approximately 12,000 residents and visitors between the 'Trade Fair' and the Interpretive Centers' Oil Century Expo. A video explaining the project is available for general distribution. The first community open house in Fort McMurray was held Dec. 13/89. Presentation to the Chamber of Comm made Nov. 23/89. Presentation to Keyano College Public Hearing was made January 20, 1990. OSLO exhibit and participation in the Connect 2000 workshop. Meeting with City Council January 13, 1990 to review project status and discuss issues. Community social services Forum Feb. 2/90. EIA Open House January 30/90. OSLO held open house information sessions in Athabasca, Boyle, Wandering River, and Lac La Biche, in early April. Attended Globe '90 March 19-25, 1990. OSLO contracting group made presentation to McMurray Puchasing Management Association in March 1990. Info. booth in McMurray Spring Trade Fair May, 1990. Industrial Forum(April/90), Aboriginal Workshop(June/90).

Concerted effort to support planning and delivery of community career fair. Numerous community events upcoming fall/90--open houses in McMurray/McKay.

Information booth in the McMurray spring and fall trade shows and the oilsands trade show in June, 1990. OSLO supported organization and implementation of the community career fair and the Alberta Economic Development Conference in November, 1990. Information meetings were held in the Redwater region and a socio-economic process review and issues identification workshop was held in Redwater with individual

ACTION

Continue to provide community liaison through OSLO office in Fort McMurray.

Socio-economic impact assessment review workshops are scheduled for May in Fort McMurray and June, 1991 in Redwater.

13.3.0.0

Community Liaison

The Key to meaningful public participation in the OSLO Project is giving the public access to the project. By doing this, local concerns can be

SITE

Upgrading

RECORD

Personal contact was made with all residents east and south of the proposed site and north of the river. Calling cards were left with each resident with an invitation to call Gordon Cook collect with any questions or concerns they may have. A series of open houses has been held in the Redwater region. The
location and date of each open house is shown below.
Redwater - September 24, Redwater, October 29, Gibbons - October 30, Smokey Lake - Nov. 1, Lamont - November 2, Fort Saskatchewan - Nov. 22.
There was also an Environmental Impact Assessment workshop held in Redwater. Three citizens from the Town of Redwater and two representatives of the
M.D. of Sturgeon participated in this one day workshop. There was excellent participation on behalf of the local residents and their input to the list of
potential impacts of the project was very valuable

ACTION

There will be a SEIA workshop in Redwater on December 11 to which several local representatives will be invited.
There will be ongoing personal contacts with local organizations and concerned individuals.

14.1.0.0

COMMUNICATIONS

Media Reports

Common

Media are an important source of information to a large part of the population, not only in the project area, but through-out Canada.

RECORD

OSLO has been working with the Media to ensure accuate and timely information is passed to as broad an audience as possible. Local radio and print media carry project stories or updates often several times weekly. Local and National Media are informed on the project and have carried a number of stories relating to status of the Binding Agreements. Considerable media coverage of the project following the Federal Budget. Television as well as radio and print gave intensive coverage, with the message that the project is still proceeding with caution and concern for future financing.
OSLO will continue to provide accurate and timely information to the media as enquiries are received.
Initiatives are underway to prepare a community
newsletter for distribution by the Project. **Considerable coverage of the project in September, since we have sought a lower profile.**

ACTION

Focus is on balancing expectations such that communities can plan but not yet commit resources pending project approval.

APPENDIX D

ROAD MAP FOR ABORIGINAL PARTICIPATION IN THE OSLO PROJECT

Framework For Aboriginal Participation in The OSLO Project

PREAMBLE

The development of this framework of conditions signifies that the company recognizes that the Aboriginal people of Northeastern Alberta have specific and unique issues that require special emphasis.

In particular, the Aboriginal people of this area face large scale unemployment - in both the job and business development areas. They face a large number of social and economic barriers which hamper their ability to secure meaningful employment and business opportunities.

The leader in these special actions must be the Governments and the Aboriginal People of the Region. The industry, however, can play a significant role. The OSLO project does present an opportunity to make a meaningful contribution, whenever reasonably practical, to the reduction of these barriers and increase benefits.

The following framework is meant to identify the the start of processes that will be implemented to ensure specific initiatives and meaningful opportunities for Aboriginal people are made available in a responsible way

OVERALL VISION

Local aboriginal participation in job opportunities and economic development initiatives that arise from the OSLO project, which assists their desire to achieve economic self-sufficiency and add value to all phases of the project.

PHASE 1 VISION (to appropriation)

A cooperative and trustful relationship whereby aboriginal peoples, government and OSLO have achieved consensus on a socio-economic development strategy and are poised for implementation immediately upon project appropriation.

BELIEFS AND VALUES

- Aboriginals should share in development in the Fort McMurray Region
- Community development is the key priority upon which development in the other areas (employment and training, education, business development) depend.
  - -Community development should be looked at in the broadest context of definition.
- Many communities do not have sufficient skills, that will allow them to initiate the actions detailed as "their responsibility" in the AIS/ANDC workshop report.
- It is important to have local people involved in working the issues who are knowledgeable and committed to the task. They need encouragement and support.
- Because elected leaders have so many matters to deal with, working subcommittees, dealing with specific interest areas, could be more effective in the issues resolution process.
- Governments, industry and communities, must acknowledge and respect elders and leaders opinions in matters affecting the environment and the impact on the Aboriginal way of life.
- Industry, Governments, and communities must work and communicate together in order to maximize social and economic development benefits.
- There are barriers and prejudice between Aboriginal and non-Aboriginal peoples because of cultural differences.
- Through direct, open communication - with industry, communities, government, and ANDC/ATC - significant progress can be made toward achievement of the VISION.

GOALS

- Industry, governments, communities, and Aboriginal organizations adopt a positive, professional working relationship with emphasis on understanding each others needs,objectives and desired way of conducting their business.
- Establishment of a process to support trust, goodwill and proactive attitude to work together and solve problems.
- Documation of Human Resources and Industrial Benefits Plans that provide for initiation of plans that will support the overall vision.
- Utilize the documentation developed in the OSLO ART interim process as a foundation for actions that support the overall vision.
- Upon project restart, OSLO will work with ANDC/ATC to maximize business, employment and training opportunities and development of business, employment, and training plans, liase with other operators and otherwise facilitate Aboriginal contracting and employment oportunities from OSLO.

STRATEGIES

- OSLO will maintain open communications prior to project restart and will provide timely information on a regular basis.
- Have governments evaluate effectiveness of current programs.
- Provide support and endorse a regional approach to work on common regional issues or encourage communities to support each other with their problem solving process.

    -This process encourages a cooperative approach, local level commitment, buy-in, information flow, continuity and hopefully effective action in the resolution process.
    -Jointly develop communications plans

- Encourage government to actively participate in extablishing ongoing dialogue with communities.
- Move beyond the intent and purpose of the H.R. and I.B. Plans as meeting government needs, to making them useful tools in the roadmap process.
- The roadmap model is a start of a process that will effectively address the specific needs associated with an ongoing consultation and communication process.
- Seek funding to facilitate participation by Aboriginal stakeholders
- Draw upon experience of others, build upon effective actions implemented by others.

ACTION PLANS

- Identify potential leaders/managers so government agencies can provide training.
- Look for opportunities to train local resource people.
- Evaluate community resources to identify human resource needs.
- Approach industry to provide problem solving and planning seminars for local leadership.
- Government and funding institutions to visit communities twice a year to review needs and have on-going dialogue.
- ANDC to invite intergovernmental agencies to meet with communities to develop long term plan to deal with lack of skilled human resources.
- Communities develop community long-term plans.
- Community needs assessments are required and should be conducted by the relevant communities
- ANDC to initiate request for government agencies to evaluate current training programs.
- ANDC / ATC / Communities to consider establishing an elders advisory council at the local / regional level(s) who would work with industry / government / friendship centre, etc. to deal with their concerns.
- Communication Plans will be developed jointly by ANDC/ATC/Industry and Government:
    - -Establish communication systems between the bands, governments, industry and other institutions.
    - -Improve communication between Metis/Treaty.
    - -Improve regional understanding

ACTION PLANS(continued)

- Develop a funding plan that would provide for:

  a./ a secondment program between communities and the public and private sectors.
  b./ short-term outside resources as identified in community plans.
  c./ a mechanism for Industry and governments to alert communities of any changes in policies or Aboriginal Services procedures at an early stage so communities can determine what adjustments may be required in their human resource.

- An aboriginal business advisor position designated in OSLO (upon project re-start, to work with ANDC and Aboriginal businesses to identify and maximize business opportunities,) assist in the development of business plans, liaise with potential contractors and otherwise facilitate Aboriginal contracting at OSLO. A post appropriation activity,

- To identify to government and regional stakeholders, the need and support required to maintain and enhance a Regional Aboriginal Communications mechanism.

  -OSLO will promote industry and government participation through statement of expected value to industry development initiatives.
  -OSLO will assist in planning and facilitating the workshop/forum to be planned to discuss and advance this concept.
  -OSLO will provide its' assessment of "complete" membership and decision making requirements of such a regional communications mechanism/forum.
  -ART wrap-up workshop will provide recommendations on subsequent steps in establishing this regional mechanism.

- Until project restart, Esso Resources Oil Sands Division will provide direct liason and ongoing communications on the OSLO project.

APPENDIX E

OSLO ART PARTICIPANTS' COMMENTS

OSLO ART PARTICIPANTS' COMMENTS

FEARO

The OSLO ART schedule and meeting timing have been generally adequate. The schedule was largely driven by the consortium and the time they needed to complete their various studies and consultations. Some of the meetings were just updates of recent developments and the meeting objective could perhaps have been met, at considerably less expense and personal time commitments, through a written update or possibly through a conference call.

The major benefits of OSLO ART were the consultation and cooperation that took place amongst the various stakeholders. The Interim Report should provide a detailed explanation of the ART process, including a careful look at where it worked well and where it could have been improved. All of the major stakeholders were represented at the ART table. FEARO found that its position as the sole representative of the federal government was not always an easy role to fill. It was really impossible for one representative of FEARO to speak authoritatively on behalf of other federal departments such as Fisheries and Oceans Canada and Indian and Northern Affairs Canada. It might have been advantageous to have representatives from these departments at the ART table. FEARO's representative believes that the direct consultation that took place between the consortium (and ART members) and the Alberta Environmental Network provided reasonable opportunity for these groups to input to the ART process.

The ART process can be a model for future pre-application reviews of large environmentally sensitive projects. If it is to be used as a model, then the process followed for the OSLO Project warrants careful examination to identify all of its successes and all of its warts. ART was cost-effective and its successes far outnumber its warts.

OSLO

The OSLO ART process was initiated as soon as was practically feasible because it was OSLO's belief that the key to meaningful regulatory and public participation was early notification on the basic scope of the project, and the opportunity to bring forward concerns and recommendations for integration into the early planning stage of the project.

OSLO considers that the membership of OSLO ART could have been expanded to include, for example, the Alberta Environmental Network, reflecting its broad environmental representation, and ID No. 18 North, recognizing its lead role in regional planning and government. As well, the formal status of organizations such as Federal and Intergovernmental Affairs (FIGA), and other agencies which subsequently sat at the OSLO ART main committee or subcommittees, should be clarified as either full members, associate members, or observers in a future review team. OSLO recommends that when ART is re-initiated, the ERCB consult with local Athabasca and Redwater community leaders, key provincial public interest groups, and OSLO to identify appropriate participants.

When the ART process is re-initiated, formal agreement on the mutual acceptability of the process must be reached between the federal and provincial governments. To ensure an efficient regulatory review, this process must jointly satisfy the environmental impact assessment and public consultation requirements of both levels of government.

It will be important to clarify stakeholder expectations regarding objectives, issues, process, results, etc. when OSLO ART is re-initiated. This should be done at the outset so that the group as a whole can make any necessary changes to the Terms of Reference and move towards a meaningful resolution of the issues, with the recognition that certain participants may have conflicting objectives.

OSLO recommends that during the operation of processes such as this, progress on resolving issues be communicated on a regular basis to the general public. This would ensure that current information is available to all individuals and groups who share a project interest. This could be a periodic newsletter or statement to the press from OSLO ART.

The Aboriginal Issues and Environmental Subcommittees should make periodic trips to the appropriate regional communities to understand and focus on important local issues. This activity is important in gaining community support for the ART process and achieving satisfactory resolution of project issues.

OSLO viewed the ART process as supportive of both project planning and regulatory review, but not replacing the formal regulatory roles of government agencies. When the ART process is re-initiated, the roles and expectations of regulatory agencies should be clarified to address the concern expressed by some participants of compromising their regulatory authority in the pre-application phase. This clarification is required to enable all members of technical subcommittees to participate fully in the discussion of the objectives and design criteria of the project and express their positions without compromising their agency or themselves.

When issues are raised such as alternative technology evaluation, responsibility for social programs, etc., it should be clarified at the outset which stakeholder has responsibility for resolution of different aspects of the issue. In areas where design considerations can be influenced by external business groups (e.g. extraction process selection) it would support resolution and agreement when it is clear who is responsible for resolution of individual aspects of such issues. It is important that all participants be as candid and as open as possible in describing the position of the organization they represent.

Representatives at the subcommittee level should have the knowledge and authority to effectively participate in the discussion and resolution of issues. All stakeholder representatives should be empowered to state "no exception" to issues and have the time to keep pace with project development.

When the ART process is re-initiated, time should be spent in discussing and reaching agreement on the level of detail required by the subcommittee members. This will enable presenters to more clearly target the information needs and level of understanding of subcommittee participants.

It is important that all ART participants have a broad integrated understanding of the project to achieve issue resolution. This can be accomplished by more frequent project integration review sessions or greater cross-representation from subcommittee to subcommittee.

OSLO recommends that the ART process, appropriately modified, be used for other regulatory approval processes where a number of diverse stakeholders are involved.

OSLO ART should develop guidelines for budgeting and cost reporting. These should be stewarded regularly to the ART Chairman and OSLO.

OSLO considers that when the above recommendations are implemented, the ART process can be completed efficiently and successfully, the public hearing would be expected to be very succinct, focused, and all stakeholders would be well prepared to move into the next phase of the project.

An ongoing regional public communication mechanism would be very useful in both the Fort McMurray and Redwater areas, for ensuring that stakeholders involved to date remain informed and in a good position to move forward expeditiously when the OSLO-ERCB application is re-initiated.

Alberta Energy

It is our opinion that the appropriate stakeholders and company and government representatives were involved in the ART process and that the relevant information was disseminated from this core group back through the individual organizations and communities.

In our opinion the OSLO ART process should remain focused on the OSLO Oil Sands Project and its benefits and impacts. Without this focus, it is likely that the discussions will drift into many areas not related to the OSLO Project. We would suggest that if OSLO and the other members of OSLO ART want to keep the momentum of this process going during this time of uncertainty, OSLO should continue to consult with the ERCB and then the ERCB could call any subsequent meetings at its discretion. These future OSLO ART meetings would only be needed when significant changes to the progress of the project have occurred.

One drawback of such a detailed consultation process is the high level of expectations created in the stakeholders' communities. This is difficult to offset but should be noted in all such processes so that the participants are aware of the high expectations and can deal with them appropriately.

An early start of an ART process allows stakeholders to make their objectives and wants known clearly. This would avoid the situation where significant technology choices are made without discussion and then justification or changes are made to try and meet stakeholder needs. There can even be a prolonged period between this initial phase and the more detailed discussion phase while the proponent does the evaluations and selections as long as he is fully aware of the stakeholder objectives and conditions up front.

The concept of regional council to publicly discuss all elements of development in the area is an excellent concept. It is worth pursuing in its own right but separate from an extension of OSLO ART. The suggestion of what this council would deal with was very broad and included forestry, oil sands employment, education, tourism, etc. As discussed, many groups and committees both locally and together with government already exist to deal with these issues. These are formed around either individual communities or specific aspects of the very broad and diverse interests in the proposed council.

The recommendation of the Department of Energy is that the concept of a new regional council could be worthwhile in streamlining regional communication and should be carefully considered. We would suggest that the duplication and overlap with existing groups be examined in detail before proceeding. Coordination with these existing groups and the involved government departments, agencies, and companies is essential. There are established communication channels for many, if not all, of these issues. In order to save time and money, these existing channels should first be utilized or modified to increase their effectiveness and, if necessary, replaced by a new mechanism such as this regional council.

Aboriginal People

The Aboriginal people noted it is desirable to view the ART process and Aboriginal involvement in energy projects in a historical perspective. Early conflicts in the eighties, particularly with Fort McKay, resulted because adequate consultative mechanisms were not in place. To counteract this, the ERCB put a forum in place. ART is the fourth in the series of ERCB application review processes, the others being Syncrude Mine Expansion, Syncrude Project Expansion, and Suncor Debottlenecking Project. A wise decision by the ERCB was made to get all the participants and affected parties together before the application stage. The ERCB process is a model for EIA and social economic review across Canada. The OSLO Project gives the Aboriginal communities opportunities to develop new socio-economic and community initiatives to address problems of unemployment, opportunities for participation, learning new businesses and new jobs.

Aboriginal people saw ART as a way for front-end input with industry and government for plans, initiatives, programs, and processes that they thought would maximize Aboriginal employment on the socio-economic side and at the same time provide the necessary environmental protection. Aboriginal involvement in the environmental impact assessment was seen as good but involvement on socio-economic matters warrants review. The Aboriginals recognized that if they were to achieve some economic benefits, a great deal of planning on their part is desirable on project restart. The Aboriginal people need resources and cooperation of government and industry to prepare themselves to participate and to develop programs to meet their needs. They also need these supports to properly participate in the planning and review of large complex projects such as OSLO's. On the process side, ART efforts to address issues and barriers in many areas were desirable. OSLO's funding was generous and provided for appropriate Aboriginal input. The process was professional and thorough by OSLO and the government and participation opportunities were extensive, fair, and open. The AIS Subcommittee was innovative and did achieve its mandate.

A major concern of Aboriginal people was the issue of Aboriginal participation in government project discussions. It was the Aboriginal view that they should participate in discussions on financing and other terms and conditions applied to the project.

ERCB

The ERCB believes that membership in the OSLO ART process was appropriate. Expanded membership such as involvement of special interest groups, although advantageous, could create difficult organizational problems. In fact the interests of special interest groups were addressed by OSLO through community and EIA workshops. OSLO is to be commended for organizing these workshops and related events to share information with and solicit input from other publics not represented on OSLO ART. This input was very useful to OSLO ART.

The participation of senior representatives of stakeholders on the OSLO ART Committee occurred. This was essential to the process.

Discussion of ongoing OSLO work was effective in identifying key issues and resolving many of them; in the case of unresolved matters there is a clear understanding of stakeholder expectations and OSLO plans.

OSLO's commitment at all levels (from executive management, technical, regulatory, environmental, and public liaison functions) was significant and greatly facilitated the process effectiveness. The availability of OSLO staff and resources was important. Additionally, the OSLO initiatives and funding assistance of public involvement, including the Aboriginal Issues and Environmental Workshops, contributed significantly to OSLO ART.

The work of the technical subcommittees was complicated and protracted by changes to the project necessitated by decoupling of the upgrader and economics. These complications can be minimized by deferring detailed discussion on certain aspects of the project. The following suggestions are provided:

1 Discussions at the outset of the development would be most effective if limited to the project description, identification of issues, regulatory requirements, and stakeholder objectives. Stakeholder objectives could be expanded to a description of "wants" in those cases where regulatory requirements fall short. Discussions at this point should be limited to more general ideas; details can be left to a review of an actual project design.

2 As the design proceeds through its various stages the ART should be kept informed and committee discussions could continue to clarify material discussed earlier or to discuss social issues with public stakeholders. But strict controls should be in place to avoid premature discussion of design details.

3 On completion of each design stage or other milestone in the design process, discussions of a more detailed nature can begin. Discussions should be led by the proponent and should focus on the design and how it satisfies the requirements, objectives, and issues identified in Step 1 above. A workshop would probably be the most effective forum. More involved discussions would focus on design features that do not address requirements and objectives. When the need for subcommittees arises, care should be taken to ensure the subcommittee divisions are appropriate considering the regulatory bodies' organization and staffing, communications between subcommittees, and avoidance of duplication or repetition in discussions.

In summary, the ERCB found ART an excellent cooperative effort. The total process was kept in mind when the ERCB selected ART members. The Terms of Reference included the requirement that the representatives speak for their organizations. The ERCB believes that it has achieved what it set out to do, through manageable groups and OSLO's initiative and effort to make it work.

APPENDIX F

PARTICIPANTS OF OSLO ART AND SUBCOMMITTEES

TABLE 1 OSLO ART PARTICIPANTS

Energy Resources Conservation Board	Dr. Richard Houlihan (Chairman) Brahm Prasad Murray Kopp Ralph Evans (former OSLO ART Chairman) Bruce Gartshore John Farnell Al Mayer Dr. George Kupfer (Consultant) Marta Poropat
OSLO	Dave Allen John Lynn George Bezaire Gary Pool Barry Noble Pat Shaw Dr. Randy Gossen Ian McLachlan Gary Mann Dave James John Rhind Leslie Young Craig Barraclough Len Pakulak Bob Lieberwirth Wayne Schmidt Carol Jones Laurie Bracewell Lindsay Dowdle Alun Jones George Hawes John Beck
Alberta Energy	Greg Stringham Bob Germain David Luff Bob Mitchell Gerry Protti
Alberta Environment	Fred Schulte Jerry Lack Bob Stone Larry Brocke
Alberta Forestry, Lands and Wildlife	Gordon Armitage Jeff Bondy Bruce MacGregor Ken Ambrock Al Bibaud Fred McDougall
Federal Environmental Assessment Review Office	Paul Scott
Municipal District of Sturgeon No. 90	Gilbert Boddez

NOTE: All participants did not attend all meetings and the participants changed depending on the topics discussed.

City of Fort McMurray	Mayor Betty Collicott Councillor Ron Morgan Councillor Earl Dionne Brian MacRae Terry Langis Chuck Knight (former Mayor)
Fort McKay Indian Band	Chief Dorothy MacDonald Mel Grandjambe Jerome Slavik (Consultant) Dr. Ron Wallace (Consultant) Judy Bennett (Consultant) Gary Ford (Consultant) Jim Boucher (former Chief) Ken Shipley
Athabasca Native Development Corporation	Mike Mercredi Betsy Brooks Alvena Strasbourg George Calliou
Federal and Intergovermental Affairs	Bill Oppen Christine Macken Chris Evans Brent Lakeman
Department of Fisheries and Oceans Canada	Bill Bond
Athabasca Tribal Council	Tony Punko
Environment Canada	Fred Zaal

NOTE: All participants did not attend all meetings and the participants changed depending on the topics discussed.

TABLE 2 OSLO ART GEOLOGY SUBCOMMITTEE PARTICIPANTS

Energy Resources Conservation Board	Cal Hill (Chairman) John Farnell Brahm Prasad	
Fort McKay Indian Band	Dr. Ron Wallace (Consultant) Gary Ford (Consultant)	
Alberta Energy	Tom Ross Anne Ing	
OSLO	George Hawes Dane Bridge Merry Nenadov Dave Sibley Ferd Lobkowicz Dave Karpluk Glenn Seve Wayne Schmidt	Barry Noble Eric Swanbergson John Innis Steve Tan Joan Lloyd Adel Tammam Gary Pool Rosalie McDonell

NOTE: All participants did not attend all meetings and the participants changed depending on the topics discussed.

TABLE 3 OSLO ART MINING SUBCOMMITTEE PARTICIPANTS

Energy Resources Conservation Board	Brahm Prasad (Chairman) John Farnell Frank Sagan Ernest Mahadeo Bruce Gartshore
Alberta Energy	Bob Mitchell Eric Axford Tom Ross
Alberta Environment	Larry Brocke Rick George
Alberta Forestry, Lands and Wildlife	Gordon Armitage Herb Walker Jeff Bondy
Fort McKay Indian Band	Dr. Ron Wallace (Consultant) Gary Ford (Consultant) Judy Bennett (Consultant)
OSLO	Wayne Schmidt John Beck Dane Bridge Gordon Cook Fred Gatton Doug Heinz Brian Leece Bill Livingston Rosalie McDonell Dave Sibley Dave Vellutini Andre Dilas Dick Dorsay Jim Blum Sam Chakrabarti Dave Duncan George Hawes Bob Lieberwirth Joan Lloyd Garry Mann Ian McLachlan Peter Olmsted Steve Tan Gary Pool Barry Noble

NOTE: All participants did not attend all meetings and the participants changed depending on the topics discussed.

TABLE 4 OSLO ART EXTRACTION SUBCOMMITTEE PARTICIPANTS

Energy Resources Conservation Board	Marvin Dmytriw (Chairman) Terry Abel Frank Sagan Brahm Prasad Dr. Richard Houlihan	
OSLO	Alun Jones Dr. Geoff Stevens Barry Noble Bill Livingston John Beck Don Wong Pat Ringstrom Ed Rendall Garry Mann	Fitz Roett Dave Rose Harry Jung Ian Lowther Bob Tipman Bill Bacon Cam MacGregor Dr. Fred Seyer (Consultant)
Alberta Energy	Bob Germain	
Alberta Environment	Bob Martel Larry Brocke	
Fort McKay Indian Band	Dr. Ron Wallace (Consultant) Gary Ford (Consultant) Judy Bennett (Consultant) N. Winston (Consultant)	

NOTE: All participants did not attend all meetings and the participants changed depending on the topics discussed.

TABLE 5 OSLO ART UPGRADING SUBCOMMITTEE PARTICIPANTS

Energy Resources Conservation Board	Terry Abel (Chairman) Rob Cox Dr. Richard Houlihan Marvin Dmytriw
OSLO	Lindsay Dowdle Blake Forrest Kim McCormack Barry Noble Francis Wu Leslie Young Mainak Ghosh Bob Lieberwirth Ken Corbett Brad Johnson Garry Mann
Alberta Energy	Bob Germain Bob Mitchell
Alberta Environment	Bill Macdonald Bob Martel

NOTE: All participants did not attend all meetings and the participants changed depending on the topics discussed.

TABLE 6 OSLO ART UTILITIES AND OFF-SITES SUBCOMMITTEE PARTICIPANTS

Energy Resources Conservation Board	Terry Abel (Chairman) Marvin Dmytriw
OSLO	Bob Lieberwirth Jim Blum Ken Corbett Dick Dorsay Leslie Young Frits Beran Bruce Gifford Mike Bridle Steve Woodbeck Harold Wiggers Sam Chakrabarti Bernie Cox
Alberta Energy	Bob Germain
Alberta Environment	Bill Macdonald Bob Martel Scott McClure

NOTE: All participants did not attend all meetings and the participants changed depending on the topics discussed.

TABLE 7 OSLO ART FORT MCMURRAY AND REGION INFRASTRUCTURE SUBCOMMITTEE PARTICIPANTS

OSLO	Craig Barraclough Carol Jones
Keyano College	Tim Walsh Doug MacRae
Improvement District 18 North	Leo Bourassa
Fort McMurray School District 2833	Judy Walbridge Bob Prather
Fort McMurray Regional Hospital	Don Ford Judy Moynihan
Fort McMurray Catholic Education Centre	Danny Law Jerry Heck
Fort McKay Indian Band	Chief Dorothy MacDonald
City of Fort McMurray	Mayor Betty Collicott (Chairperson) Brian MacRae
Athabasca Native Development Corporation	Mike Mercredi

NOTE: All participants did not attend all meetings and the participants changed depending on the topics discussed.

TABLE 8 *OSLO ART ABORIGINAL ISSUES SUBCOMMITTEE

Energy Resources Conservation Board	Dr. George Kupfer (Chairman) Al Mayer Ralph Evans
Industry, Science and Technology Canada Aboriginal Business	Lloyd Bisson
Indian Affairs and Northern Development	Bill Sorobey
Canada Employment Centre	Brent Gray
Alberta Federal and Intergovernmental Affairs	William Oppen Christine Macken
Alberta Municipal Affairs, Native Services	Cliff Supernault John Shannon Dave Johnston Bev Davies
Alberta Career Development and Employment	Lois Hawkins Ollie Schell Wilma Fisher
Federal Environmental Assessment Review Office	Paul Scott
Fort McKay Indian Band	Chief Dorothy MacDonald Jim Boucher (former Chief) Jerome Slavik Ken Shipley Dr. Ron Wallace
Indian and Northern Affairs Canada	John McIsaac Noreen Marshall
Keyano College	Jeanne MacIntyre
Athabasca Native Development Corporation	Alvena Strasbourg George Calliou Mike Mercredi
Athabasca Tribal Council	Tony Punko
OSLO Alberta Limited	Pat Shaw Dr. Randy Gossen Carol Jones Laurie Bracewell Craig Barraclough

* Not all members served throughout the entire time.

TABLE 9 OSLO ART ENVIRONMENTAL SUBCOMMITTEE PARTICIPANTS

Alberta Environment	Fred Schulte (Chairman) Rick George (Secretary) Bob Stone Larry Brocke Glenn Winner Jim Luk
OSLO	Dr. Randy Gossen Garry Mann Dave Duncan Ken Corbett Leslie Young Al Kennedy Barry Noble Pat Shaw Gary Pool
Alberta Forestry, Lands and Wildlife	Gordon Armitage Al Bibaud Jeff Bondy Glen Bergstrom Herb Walker
Fort McKay Community	Gary Ford Dr. Ron Wallace Chief Dorothy MacDonald
Federal and Intergovernmental Affairs	Bill Oppen
Energy Resources Conservation Board	Bruce Gartshore Murray Kopp Ralph Evans Terry Abel
City of Fort McMurray	Mayor Betty Collicott
Alberta Energy	Greg Stringham
Athabasca Native Development Corporation	Mike Mercredi
Athabasca Tribal Council	Tony Punko
Municipal District of Sturgeon No. 90	Gilbert Boddez A. Bochanesky
Saskatchewan Environment and Public Safety	Graham Mutch
Indian and Northern Affairs Canada	Wes Shennan Prem Kumar

NOTE: All participants did not attend all meetings and the participants changed depending on the topics discussed.

NWT Renewable Resources	Lorne James Stu Lewis
Health and Welfare Canada	Judith Fitzpatrick Surindar Grewal
Fisheries and Oceans Canada	Bill Bond Glen Hopky
Environment Canada	Fred Zaal Kath Rothwell

NOTE: All participants did not attend all meetings and the participants changed depending on the topics discussed.

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